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DEC 16 1994 NEWSLETTER

AG Library

No. 12 • July 12, 1994

This newsletter is issued weekly to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Yellownecked Caterpillars

Reports of defoliation from yellownecked and walnut caterpillars flow in from southern Illinois counties. Young first- and second-instar larvae of yellownecked caterpillars are feeding in Champaign County and other locations in central Illinois.

Larvae of both species feed together as a group. Young yellownecked caterpillars are reddish with yellow stripes. Mature larvae are black with yellow stripes and have an orange and yellow band behind the head.

Both species of caterpillars can cause severe defoliation on many ornamental tree species. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) effectively controls young, actively feeding larvae. Additional information about both caterpillars was included in HYG No. 8 (June 14). (John Lloyd)

Fall Webworm

Silk tents of first-generation fall webworm larvae are now seen on elm, sweet gum, crabapple and other deciduous trees in southern Illinois. Fall webworm has two generations in southern and central Illinois and one in northern Illinois. This year, first-generation tents appeared later in the season than usual.

Webworm larvae are light green to yellow in color with black spots and fine white hairs. They grow approximately 1-1/2 inches long before they pupate. Larvae build silk tents around the leaves

at the end of branches. They feed on the leaves inside the tent. As the leaves are consumed, the tent is enlarged to enclose additional leaves.

Removal of infested branches or physical destruction of larvae and tents is an effective form of management. Chemical control with *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) is effective on young larvae. *B.t. kurstaki* must be ingested by larvae to be effective. As with other chemical compounds listed for webworm control in the 1994 Illinois Urban Pest Control Handbook, Bt sprays need to penetrate the larval tent in order for control to be effective. (John Lloyd)

Mimosa Webworm

Honey locust trees in Urbana are showing a mixture of mature first-generation larvae and very young second-generation larvae. Trees near heated buildings appear to have fairly high populations that may need treatment. Based on this information, the second generation should be completely out in southern Illinois, and sprays to prevent severe damage may be needed at this time. In central Illinois, sprays for the second generation will probably be needed about a week after you receive this newsletter because the young larvae of the second generation cause little damage and it is probably best to wait until the entire second generation has hatched. In northern Illinois, scout the trees to determine the stage of growth of the population; there may be time to obtain control on first-generation larvae. *Bacillus thuringiensis kurstaki*—sold as Dipel, Thuricide, and other trade names—should be effective, as well as other chemical insecticides listed in the 1994 Urban Pest Control Handbook. (Phil Nixon)

Phylloxera on Pin Oak

One of the joys of Extension entomology is the diversity of insects that one encounters. Every once in a while you come into contact with





Phylloxera damage on oak

something that you haven't seen before. Occasionally, you might encounter something that few other entomologists or other people have ever seen. This occurred the week of July 4.

A sample of pin oak leaves was brought in from Murphysboro in southern Illinois with the young leaves twisted and contorted as shown in the accompanying illustration. Superficially, it looked like damage seen on red maple caused by potato leafhopper, but I knew nothing about its occurring on oaks. Very tiny, whitish insects about one millimeter long with fleshy lobes covering the upper body surface were numerous on the leaf undersides next to the midvein.

Subsequent work by David Voegtlin, entomologist at the Illinois Natural History Survey, and me revealed these sucking insects belong to the family Phylloxera. Most phylloxerans are found causing galls on hickory, and large numbers have been present on the leaf petioles of shagbark hickories all over the state this spring. They usually cause little damage; thus control is usually not needed.

But this particular phylloxera does not form a gall: it sucks sap from the developing leaf, causing it to distort. Before last week, there were none of these non-gall-forming phylloxerans in the insect museum of the Illinois Natural History Survey, a collection that contains about 7 million specimens, primarily from Illinois.

We would be interested in receiving reports of this insect's presence elsewhere in the state and would appreciate any specimens mailed to us. This insect is not likely to cause serious damage to pin oak and should be easily controlled with sprays of bifenthrin (Talstar), cyfluthrin (Tempo), or acephate (Orthene). *(Phil Nixon)*

Millipedes

Reports of millipedes swarming into houses have poured in from every corner of Illinois. Millipedes are long, tubelike insects with two pairs of legs per segment. This characteristic of "millions of legs" gave them the name millipede. Millipedes are relatively harmless creatures. The majority feed on decaying organic matter, fungi, and bacteria. They are nature's decomposers.

When preyed upon, some millipede species release a foul odor containing hydrogen cyanide. Although this odorous gas just irritates predators, it can be toxic to insects and other arthropods placed in the same collecting container by adventurous entomologists.

Lawns with thick and moist thatch or areas with high concentrations of organic matter (as in mulch) may create millipede population explosions. When this happens, they can invade homes and cause a major nuisance problem. Reducing mowing height will help dry out thatch and assist in reducing millipede numbers. Keeping mulch away from the foundation of the house will reduce millipede problems and other occasional invader pest problems. In addition, caulking cracks and crevices in the foundation will prevent them from entering structures.

Chemical treatments for millipedes are generally ineffective and unnecessary. Chemical-barrier treatments to the high-organic areas where millipedes reside are adsorbed by the organic matter and lose activity.

Although some millipedes are pests in greenhouses in Florida and the Southeast, the primary problem in Illinois is their nuisance as unwanted house guests. The methods of prevention are the best form of management. Although they are unattractive, they are a necessary part of the decomposition process. *(John Lloyd)*

PLANT DISEASES

Powdery Mildew

The powdery mildew diseases affect woody and herbaceous ornamentals as well as vegetable, cereal,

and fruit crops. These fungal diseases are easy to identify because of the characteristic white to light grayish powdery growth, primarily on leaves. Because these fungi flourish when the days are warm to hot, the nights are cool, and the dew forms on the foliage, expect to see powdery mildews soon. They will be most severe on crowded plants in shaded locations or where air circulation is poor.

After the initial symptoms of a white powdery growth, powdery mildew may cause stunting, curling of leaves, chlorosis, premature leaf drop, and deformation of flower buds. In most ornamental plantings, the damage is primarily aesthetic. An example is lilac, as shown on picture sheet "Woody Ornamental Diseases I." With fruit crops such as apple, however, there may be twig damage, fruit loss, or loss of fruit quality.

Unlike most fungal diseases, powdery mildew is not as destructive when rains are frequent. High relative humidity (but not rain) is needed for spores to germinate, and mildew develops rapidly in extended periods of warm, dry weather when morning dews are heavy. Ideal disease conditions are 90 to 99 percent relative humidity at 66° to 72°F.

Homeowners will want to look for cultivars resistant to mildew when possible. Pruning out diseased wood (especially on rose and crabapple) during the normal pruning period will greatly reduce overwintering inoculum. Try to prune plants to allow better air circulation, and never handle the infected plants when they are wet. As usual, plants should be maintained in high vigor to withstand disease attack.

Fungicides can be used on a preventive basis to control this disease. This means you must start sprays when you first see the disease. Specific recommendations are listed in the following publications: *Midwest Tree Fruit Handbook*, Circular 1292; *Home Fruit Pest Control*, Circular 1145; and the *1994 Illinois Urban Pest Control Handbook*.

Powdery mildew is discussed in *Report on Plant Diseases* (RPD) No. 617. A photograph on oak is shown on the picture sheet "Tree Diseases I." A mildew of lilac is shown on the picture sheet "Woody Ornamental Diseases I." (*Nancy Pataky*)

Tomato Spotted Wilt Virus (TSWV) on Ornamentals

This virus attacks hundreds of floral crops, bedding plants, vegetables, and weeds. The Plant Clinic confirmed recent cases on tomato and impatiens. TSWV is found most commonly in garden and New Guinea impatiens, gloxinia, cyclamen, and exacum. It is a very serious problem in greenhouses where

environmental conditions are favorable for the growth and maturation of the insect vector of this disease, thrips (at least nine species of *Thrips*, *Frankliniella*, and *Scirtothrips*). The symptoms vary greatly from crop to crop and include various degrees of yellowing, browning, stunting, and enations. Many young plants decline and die. Terminal bud killing, white-to-yellow or dead-ring spots, and line patterns on leaves are common in older plants.

Other symptoms include infected leaves that are often distorted with vein and petiole necrosis, black or purple stem streaks, premature leaf or bud drop, stunting, distorted leaf shapes, whitish or black leaf spots (sometimes zoned), necrotic young leaves, colored spots, line and ring patterns, and stripes on flower petals. Flowers open late and are commonly distorted. Diagnosis based solely on symptoms is difficult. Symptoms vary greatly with the age of a plant and level of nutrition—and especially with environmental conditions. Some infected plants may even be symptomless.

Tomato spotted wilt virus (TSWV) is difficult to control where there is a source of the virus, many susceptible host plants, and an abundance of thrips vectors. Prevention, early detection, and quick action are required in greenhouse situations. This involves prompt destruction of infected plants, a routine thrips control program using insecticides suggested by University of Illinois Extension entomologists (see the *1994 Illinois Urban Pest Control Handbook*, available at all Extension offices). In field situations insect control is not as easy. Control of weed hosts and use of clean transplants is essential. For much more information including monitoring procedures for thrips in greenhouses, other controls, and a fairly complete listing of plants susceptible to TSWV, read RPD No. 665, "Tomato Spotted Wilt Virus." (*Nancy Pataky*)

Bacterial Canker of Tomato

Tomato plants received by the Plant Clinic last week were diagnosed as having bacterial canker, and we have received a few calls from growers describing symptoms suggesting infection by the bacterial canker organism. Much like *Verticillium* and *Fusarium* wilts (see newsletter No. 9, June 21), bacterial canker is caused by an organism that invades and colonizes the vascular system of the plant. The dysfunction of the vascular system results in the infected plant's becoming water stressed and nutrient deficient. Thus, infected plants are stunted, are off color, and may show wilt symptoms, especially during the heat of the day. Other symptoms of the disease include a downward turning of lower leaves, marginal burning of

leaflets, and a yellow to reddish brown discoloration of the vascular tissue.

Necrotic spots may also develop on the leaves, but they will not usually show the yellowing symptoms often seen with infection by *Verticillium* and *Fusarium*. In some cases brown streaks and cankers will develop on the outside of the stem, but these symptoms are often absent. Characteristic fruit spots may also be present. These spots are often called "bird's-eye spots" because they consist of a raised brown center surrounded by an opaque white halo. These spots are usually very small, and not always present, but are a useful diagnostic aid.

The disease is caused by a bacterium called *Clavibacter michiganensis* subspecies *michiganensis*. This bacterium has been shown to survive in the field on infested plant debris, but it is thought that most epidemics start from infected seeds or transplants. The disease progresses very slowly at first. It usually takes 3 to 6 weeks from the time of infection to the first expression of symptoms. Once in the field, the pathogen can spread to neighboring plants, resulting in spots on the leaves and fruit. But the newly infected plants will probably not develop the systemic wilt symptoms. The systemic phase of the disease can be spread by the handling and clipping of seedlings prior to transplanting. The most important method of control is the use of disease-free seeds or transplants, along with rotation to non-solanaceous crops and incorporation of infected plant debris into the soil to encourage rapid decomposition. At present, there are no rescue treatments for bacterial canker. (*Darin Eastburn*)

Rhizoctonia Root Rot of Flowers

There are various root rot problems of ornamental plants. The most commonly encountered problem at the Plant Clinic recently has been rhizoctonia root rot. This fungal disease can cause damping-off of seedlings, a firm basal rot of cuttings, or root rot of more mature plants. Infection is favored by an intermediate moisture range and warm-to-hot temperatures, so many areas of Illinois are ripe for this problem now. Because *Rhizoctonia* is found in most soils and can survive for many years on debris or as sclerotia, it has the potential to infect in many plantings.

Look for plants that are stunted, are low in vigor, or wilt easily on a warm day. The foliage may turn yellow to brown and may fall from the plant. In many cases the lower leaves fall first and leaf drop progresses up the stem. Carefully dig the plant and

wash the roots and stems, looking for signs of rotting or decay. *Rhizoctonia* usually causes a dry rot of root and stems with a reddish brown color. The stem may have distinct dead, sunken areas (still dry) which partially or totally girdle the stem.

Many cultural practices will help prevent the root rot problems. Start with only top-quality seed or transplants. Plant in fertile, light, well-drained soil. If you are using containers, be certain that they are clean and that initial plantings are made into a sterile soil mix. Where possible, avoid overwatering. Rotate outdoor plants with unrelated plants for several years. *Rhizoctonia* is a particular problem on impatiens. Because shady spots are often relegated to this plant, growers rarely rotate from impatiens until forced to do so by this disease. Some researchers suggest adding composted hardwood bark as a growing medium or mulch to help suppress root rotting fungi. Other control measures and discussions of the major root rot fungi, disease cycles, etc., are contained in RPD No. 615, "Damping-off and Root Rots of House Plants and Garden Flowers."

Chemicals are used as preventive controls and must be applied before symptoms are evident. Chemicals, however, may be used to protect healthy plants once the disease is spotted in a planting. Current recommendations are listed by host plant in the 1994 *Illinois Urban Pest Control Handbook*. Two fungicide mixtures that control most major fungi include Banrot and SA-Terraclor Super-X. If *Pythium* or *Phytophthora* only are involved, Aliette, Truban, Terrazole, or Subdue can be used. If *Rhizoctonia* is the major cause, PCNB (Terraclor, Fungi-clor, or PCNB 75WP) is a good choice. Be certain to read the label for specific host crop clearance and details on rates and timing. (*Nancy Pataky*)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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No. 3 • May 10, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report: What to Look For

Eastern tent caterpillar tents on deciduous trees and European pine sawfly feeding damage on pine have been identified in Chicago and northern Illinois. Management for both insects should be initiated before major defoliation occurs. Yellow poplar weevil infestations are still being reported in southern and southcentral Illinois. Refer to *HYG* no. 1 and 2 for management recommendations. The *Illinois Fruit and Vegetable News* reported catches of codling moths in pheromone traps in far-southern Illinois and predicts that peak flights will occur the week of May 8 in the far south. Codling moths haven't been captured in traps from Belleville, Illinois, north as of the week ending May 3.

Insects that will be hatching or emerging soon and that should be scouted for include cankerworms, aphids, pine needle scale, hackberry psyllids, cooley and eastern spruce gall adelgids, clover mites, codling moths, and plum curculio. If you notice anything emerging in your area, please let us know. The more eyes we have in the field, the more precise our newsletter will be for you. (John Lloyd and Phil Nixon)

Spruce Spider Mite

Overwintering eggs of spruce spider mites are hatching on spruce, arborvitae, juniper, hemlock, pine, Douglas-fir, Siberian larch, and other conifers in Illinois. Spruce spider mites are cool-season mites that

attack stressed trees in the spring and fall of the year. Three or more generations of spruce spider mite occur each year in Illinois.

Mites feed on older needles of trees and cause speckling of the needles by destroying chlorophyll-bearing cells with their toxic saliva. Mite infestations can be identified by looking for damage on older needles and by shaking suspected infested branches over a white piece of paper. Little orange dots moving on the paper are probably spider mites. If different sizes and colors of mites are found, you probably have predaceous mites that are feeding on the spider mites. A hand lens can be used to distinguish between the different types of mites.

Most spider mite populations can be managed by reducing tree stress and letting natural enemies, such as predaceous mites, eat them and reduce their numbers naturally. In some cases, pesticidal treatments may kill the predaceous mites and other natural enemies that feed on the spider mites; spider-mite populations may thereby be increased by releasing the spider mites from natural control. In severe infestations, natural control may not be an option. Treatments with dormant oils, summer oils, and insecticidal soaps greatly reduce spider mite populations. Repeat treatments are necessary with insecticidal soaps. Oils will discolor blue spruce. Other chemical management options for spruce spider mites are listed in the *1995 Illinois Urban Pest Management Handbook*. (John Lloyd)

Iris Borer

Iris borer overwinters as eggs in old leaves and other debris at the base of the iris plant. These eggs hatch in April or early May into larvae that crawl around on the leaves for a few days before entering them. Once they enter the foliage, they act as leafminers, tunneling to the base of the leaves throughout the spring. This leafmining damage appears as water-soaked.

brownish spots and streaks on the leaves. The borers reach the rhizomes by July and tunnel into them.

In the rhizome, they grow to be 1-1/2 to 2 inches in length—fat-bodied, pink larvae with brown heads. Their tunneling in the rhizome is particularly damaging to a smaller-rhizomed iris such as Japanese or Siberian iris. A tall, bearded iris, with its larger rhizomes, frequently is able to sustain this damage and still survive. Perhaps the main problem with infestation of any iris species is the introduction of bacterial soft rot that can destroy the rhizome. Iris borer pupates in the soil and emerges as brown moths in August, laying eggs in debris around the plant into the fall.

Iris borer larvae can frequently be squashed while leafminers within the leaf. The larva will be at the lowest point of the mine and easily can be located. Dimethoate (Cygon) can be sprayed on the leaves to kill the larvae as leafminers, ideally when the leaves are 5 to 6 inches tall. Partial control still should be possible in the southern two-thirds of the state, with better control likely at this time in northern Illinois. Add a few drops of detergent or other spreader to the spray mix to get better coverage on the waxy iris leaves. (*Phil Nixon*)

Lilac (Ash) Borer

Male adult lilac or ash borers have been occurring in pheromone traps in southern Illinois in the Marion area for about 3 weeks, as reported by Noel Troxclair and Eddie Billingsley, Extension educators in IPM and horticulture, respectively. These borers usually fly for 4 to 6 weeks and peak near the end of that time. We recommend that sprays for control of hatching borer larvae be applied one week after peak emergence. Based on that data, sprays of chlorpyrifos (Dursban) should probably be applied in southern Illinois around May 20. Because the spray residue is likely to last for 3 to 4 weeks on the trunk and larger branches of ash and lilac, exact timing is not as critical as for many other treatments.

Lilac borer and ash borer are believed to be the same insect, although moths that emerge from one host are likely to attack the same host species. The adult moths are about one inch long and appear similar to paper wasps in shape and color. They are dark brown, with wings that are clear and mostly scaleless, except at the leading edge of the front wing. Their wings are narrow like those of the paper wasp, and they tend to hold them out to the side as wasps do.

Female moths lay their eggs in bark crevices and wounds on the branches and trunks of ash and lilac. These wounds are commonly old emergence holes from adult borers, as well as wounds caused by pruning, storms, and other damage. The white larvae tunnel through the branch or trunk and grow to be about one inch long. Due to their tendency to attack emergence holes and other wounds, several larvae are likely to occur in the same area on the host. There is one generation per year.

Nonchemical control includes pruning out older, thicker trunks and branches on lilac. Borers rarely attack stems less than 2 inches in diameter. Avoiding pruning on young ashes will also help reduce attack. Pruning done on either lilac or ash should be done in the second half of July to avoid fresh pruning wounds for egg-laying and to allow the maximum amount of time possible for wound closure to occur before egg-laying the following spring. (*Phil Nixon*)

Honeylocust Plant Bug

Honeylocust plant bug sucks the sap from honey locust leaflets, causing them to be distorted with brownish areas. In severe infestations, the leaflets and rachises drop from the trees in early June, to be replaced with new leaves. Although this pest is not a threat to the health of the tree, it definitely affects its aesthetic appearance.

Honeylocust plant bug adults are lime green and about 1/8 inch long. They are very active running across the foliage and fly easily when disturbed. Nymphs are similar in appearance and behavior except that they are smaller and cannot fly. Nymphs hatch from overwintering eggs in young honey locust stems. They become adults in late May in central Illinois and are present in southern Illinois at this time. They are uncommon north of I-80 in Illinois.

If these plant bugs are numerous on the foliage, sprays of acephate (Orthene), bifenthrin (Talstar), or cyfluthrin (Tempo) should provide control. (*Phil Nixon*)

Maple Bladder Gall

Maple bladder gall is starting to appear on new leaves of silver and red maple throughout Illinois. Early spring foliage next to the trunk and main branches is the first to be affected. Maple bladder gall appears on the top of new leaves as little green bumps that rapidly turn red in the spring and form a bladder or pouchlike gall. Maple bladder galls and many other maple galls

are produced as a plant's response to feeding by an eriophyid mite.

In the spring, adult mites move from their overwintering sites under bark scales to the newly developing leaves. When the mites start feeding on the underside of the leaves, mechanical damage and salivary secretions from the mites initiate the production of normal plant growth hormones that induce abnormal cell growth. The resulting growth is a gall. Galls form a protective barrier around the mites; from within it, the mites feed and lay eggs. Young mites hatch from the eggs and feed within the galls. When the mites mature, they leave the gall and continue the infestation by feeding on new leaves and creating new galls. As the season progresses, mite activity diminishes and gall formation on new foliage ceases. Later in the season, galls on older foliage turn darker red to black.

Maple bladder gall does not threaten the plant's health and is a problem only for people who are concerned about the tree's appearance. From an entomological perspective, the red galls can add a unique color contrast to the landscape. Management of maple bladder gall is difficult at best. Any methods of management need to be initiated before gall formation begins. Gall formation continues once it is initiated, even if mites are killed. Dormant-oil treatments to the trunk and branches kill overwintering mites. Chemical treatments are not recommended for gall control. (*John Lloyd*)

Pine Bark Adelgid

Infestations of pine bark adelgid have been reported by Noel Troxclair, IPM educator in Marion, Illinois. Adelgids, which look like little black aphids covered with white waxy material, were imported from Europe. They feed through the bark on the phloem and can be found on the trunk and branches and at small clusters at the bases of needles on twigs on white, Austrian, and Scotch pines. In heavy infestations, trees may look as if they are whitewashed. Severe infestations can be detrimental to tree health.

Immature forms of pine bark adelgids overwinter and begin feeding during the first warm weather. As they feed, they excrete a woolly mass that eventually covers them. When the adelgids mature in early spring, they lay eggs. In April and May, the eggs hatch into a crawler stage that spreads the infestation throughout the tree; the crawlers can be blown by the wind to spread the infestation to other host trees. When the crawler settles, it remains in the same place until the next molt. The adelgid is most abundant on

the trunks of trees that are at least 10 years old. The infestations on younger trees tend to be on branches, small twigs, and shoots.

In severe infestations, management of the adelgid is necessary to maintain tree health. Management can be aimed at all stages of the adelgid, but the crawler stage tends to be more susceptible to control. Mouthparts of the adelgid are long and can create a dilemma when you're trying to determine if control has been successful. Even when the adelgids are dead, they commonly remain stuck to the tree by their mouthparts. One way to determine mortality is to run your hands over the adelgids. If your hand comes away sticky, they are alive; if not, they are probably dead. Powerful sprays of water may knock some adelgids off the trunks of trees and provide some mechanical control. Management with dormant and summer oils are effective against all stages of the adelgid. Insecticidal soaps and other chemical insecticides listed in the *1995 Illinois Urban Pest Management Handbook* will provide adequate control of pine bark adelgids. (*John Lloyd*)

PLANT DISEASES

White Pines Suffer

The Plant Clinic has received 15 samples of white pines already this season. We have received at least that many telephone inquiries about this species. Samples and questions have come from as far north as the Chicago area and as far south as Marion. Symptoms vary but generally include some pattern of needle yellowing or browning, shriveled bark on branches or trunk, sap exudate on branches, and (in some cases) death of the trees. The trees range in size from 2 to 20 feet, or taller.

At the Plant Clinic, we have tested most of these samples for the presence of the pinewood nematode and are happy to report that it has not been found. We have cultured for needle-and-stem fungal pathogens and find nothing there as well. Because root-rot fungi can cause root decline and subsequent top dieback, we also have done root cultures for these pathogens and, again, find nothing. It does not appear that this is an infectious disease problem.

This sort of problem will probably generate many theories that can never be proven one way or the other. The following gives some fact and some theory on the situation as we see it from the clinic. Possibly this will be of help to some of you.

White pines are understory trees in the cool, moist, well-drained soils of Wisconsin. We can grow them with intermittent successes in Illinois. Many of the problem trees we have seen or discussed have been in tight clay sites, exposed to the elements (windbreak trees). It is likely that the site stress has contributed to the decline of these trees. In a few cases where we have seen roots, the outer layer easily pulls off, exposing the brown, dead tissue below. The excessive rains of the past 2 years also may have contributed to root injury and decline by saturating the soil and causing a lack of soil oxygen. It does not appear that mechanical injury or chemicals are to blame. In most cases, the trees were in established sites, with no chemical usage reported and no traffic over the roots.

Another likely factor, particularly for the younger trees, is the freeze and thaw of the past winter. White pines have shallow root systems and are sensitive to temperature changes. The young trees cannot tolerate as much root injury as older trees and may have been injured by the freeze-thaw of the winter.

What can you do? Because this is not an infectious disease situation, we do not advocate quick removal of the apparently dead trees. Give them a chance to recover, and do not remove them until you are certain they are dead. Try digging in the root system (carefully), and look at a few of the roots. If they are brown in cross-section and the outer layer easily pulls off, or is not present, then root injury has occurred. If the roots are white and healthy, then the problem is aboveground and our theory is wrong. A light application of a balanced fertilizer may help to give trees a boost. If periods of drought occur, water the trees to keep them vigorous. All you can do is pamper the affected trees and hope that weather conditions permit their recovery. (*Nancy Pataky*)

White Pine Blister Rust Report

White pine blister rust is a problem on five-needle pines in some parts of the country. Regions with a high risk have average July temperatures below 70°F, which generally means Illinois is safe. This rust disease requires an alternate host to complete its life cycle. Most species in the *Ribes* genus are susceptible. Early in this century, the elimination of the wild currant helped decrease disease incidence. The alpine currant is also a *Ribes* species and potentially could serve as an alternate host. Because the blister rust disease is not a problem in Illinois, there should be no problems with planting the alpine currant.

A positive case of white pine blister rust was reported this past week by Rex Bastian (of Hendricksen the Care of Trees). He found an infected pine in the Village of Riverwoods. The tree was part of a landscape planting and had been shipped in from Wisconsin. The tree was scheduled to be removed this week.

White pine blister rust is easily diagnosed by the conspicuous rust cankers on the trunk or branches. In the spring, you see the bright yellow to orange blisterlike pustules on the wood. We see no connection between this rare problem in Illinois and the decline of white pines just described. (*Nancy Pataky*)

Sphaeropsis Tip Blight

This needle-and-stem disease is also a pine problem but most frequently occurs on the Austrian pine. You may know it as diplodia tip blight, a name that was replaced several years ago.

Sphaeropsis tip blight is back with a vengeance this year. The symptoms are easy to see, even for a nonpathologist. The fungus causing the disease invades the new needles, causing stunting, browning, and twisting of the new shoots and needles. Last year's infection appears on the tips of branches even before new candles emerge; and you can observe that now as brown branch tips appear, scattered over the tree. If the new candles die, new buds are initiated below the branch tips, and the tree appears disfigured. Perennial bleeding cankers (resin exudate) are also common with this disease.

Once the infected tissue dies, the fungus produces fruiting structures called pycnidia. These appear as pinhead-sized black specks at the base of infected needles and on infected cone scales. Gently pull out a few of the tip needles, and look at the base of the needles for these pycnidia. They are easy to see on the needles, but more difficult on the new twigs. If you see these on dead wood already this year, you are most likely looking at the previous year's infection—a good place for the fungus to overwinter.

Sphaeropsis can be controlled, but not easily. Prune and remove all dead and dying wood, including the cones. For trees that have a perennial problem with this disease, chemical sprays may be justified. Even then you may not see complete control. John Hartman of the University of Kentucky has conducted some research on this disease on pine. He states that his experience shows that three sprays are necessary to prevent infection and that pruning of infected

material is also necessary. The three sprays should be applied at about 2-week intervals. Apply at bud swell, half-elongation of candles, and again when candles are fully expanded. Chemical options are listed in the *1995 Illinois Urban Pest Management Handbook*, but Hartman has had best success with the thiophanate methyl product (Cleary 3336).

For more information on this disease, consult *RPD* no. 625, as well as the picture sheets that accompanied last week's newsletter. (Nancy Pataky)

Apple and Crabapple Scab

Scab is one of the most severe diseases of apple and crabapple trees in Illinois; it causes complete defoliation in some cases by mid-June. Although there are many sources of resistance in newer varieties, the older crabs are almost all susceptible.

The causal fungus, *Venturia inaequalis*, requires a continuous wet period to infect. In warm weather, the wet period necessary is shorter. From 59° to 76°F, infection can occur in only 9 hours. The first lesions appear on the under surface of the flower sepals or flower cluster leaves. At first, spots are light brown to olive green and later have a velvety dark brown appearance. Infection also can go to the fruit (see "Tree Disease I," picture sheet no. 14).

Apple scab can be controlled using fungicides, but applications must begin when buds begin to open (budbreak or green tip) and continue at 7- to 10-day intervals until frequent and prolonged wetting periods are uncommon (about July 1). Chemical recommendations vary, depending on type of planting. Commercial fruit growers should consult Circular 1151, *Illinois Commercial Tree Fruit Spray Schedule*. Home fruit growers, as well as arborists growing crabapples, should consult the *1995 Illinois Urban Pest Management Handbook*.

Fertilization and watering are frequently advised for crabapples and apples defoliated by scab. This can pose a problem because high fertilization causes lush growth, which is more susceptible to fire blight (discussed in *HYG* issue no. 2). Watering alone may be all that is needed to help the trees leaf out again. *Report on Plant Diseases* no. 803 discusses apple and crabapple scabs. (Nancy Pataky)

colorful this spring, ranging from white to yellow to purple. Many of us assumed that the purple plants were mostly henbit. Larry Casey, crop systems Extension educator at Effingham, took a closer look and found what he thought to be two different types of plants. He sent some in for identification; and, sure enough, Larry was right on target.

Both plants had purple flowers and square stems, indicating that they were in the mint family. One plant is typical henbit (*Lamium amplexicaule*), with purplish stems and leaves. The leaves are rounded, with rather deeply cut margins. The lower leaves have petioles, but the upper ones clasp around the stem.

The other plant, purple deadnettle (*Lamium purpureum*), has simple purple flowers; but leaves toward the top of the plant have petioles, do not clasp around the stem, and tend to cluster at the top. The leaves are more triangular than rounded and are not as deeply cut. Some of these plants tend to be a lighter green than the henbit. A supposed hybrid of the two species is referred to as *Lamium hybridum*. There is also hempnettle, but it is a different genus.

A complete understanding of the winter-annual life cycle is important when deciding on control measures. Winter annuals germinate in the fall, overwinter as seedlings, flower in the spring, then die in late spring as the temperatures rise. If you have a problem with winter annuals this year, make a note of it and consider applying a preemergence herbicide this fall before they germinate again. Many products labeled for landscape use can control winter annuals before they germinate; labeled products include Barricade, Pendulum, Predict, Gallery, and Casoron.

If you are not willing to wait for natural dieback and mechanical control is not feasible, you can control winter annuals with postemergent herbicides. Roundup, Finale, and Image should be effective. (Rhonda Ferree, adapted from an article by Ellery Knake in 4/21/95 Pest Management & Crop Development Bulletin)

Controlling Aquatic Vegetation

Aquatic vegetation is useful in many ways; however, in excess, it does cause problems. Because aquatic areas are special ecosystems, control measures must be chosen carefully.

The most important step in controlling aquatic vegetation is proper identification. Control measures for specific weed types vary as widely as the plant types themselves. If you are not familiar with aquatic vegetation (including algae types), call your Extension office for help.

HORTICULTURE

Henbit and Purple Deadnettle

Winter annuals—including henbit, common chickweed, and many wild mustards—have been quite

Another important factor to consider is the use of the site. Most aquatic herbicides contain use restrictions given in terms of the number of days that must pass before the specific use can occur. For example, you should consider whether or not the water will be used for drinking by humans or animals, for swimming, for fish consumption, or for irrigation.

Control includes chemical and nonchemical measures. Several nonchemical control options are available. Preventive control is achieved through nutrient control or habitat manipulation. Mechanical control physically removes the vegetation. Cultural control includes the use of drawdowns, dyes, plastics, or aeration techniques. Biological control using geese, swans, or the triploid grass carp has been extremely successful in some instances. Fifteen to 30 grass carp should be used per acre. Grass carp will not eat microscopic algae and must be introduced by a holder of special permits.

Consult the *1995 Illinois Urban Pest Management Handbook* for recommendations on which herbicide to use for control of a specific weed. Only a handful of herbicides are labeled for use in aquatic areas. Commercial applications require an aquatic applicator license from the Illinois Department of Agriculture. In general, chemical recommendations break down as follow:

Algae: coppers

Flowering plants:

—Submersed (pondweeds and naiads): endothal, Sonar, Reward, or Casoron

—Free-floating: Sonar or Reward

—Rooted-floating (lilies): Rodeo, sonar, Casoron, Reward, or 2,4-D

—Emergents (cattails): 2,4-D or Rodeo

Always follow label directions closely. (*Rhonda Ferree*)

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JUN 26 1995

No. 4 • May 17, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Oystershell crawlers (of the brown race) are hatching from eggs under the scale shells on apple and dogwood and other ornamental hosts in southern Illinois. The banded race will be hatching later in May and June on lilac, ash, willow, poplar, and maple. As with other armored scales, management should aimed at the crawler stage.

Overwintering elm leaf beetles have laid eggs, and the eggs are starting to hatch. Damage from larval feeding will become apparent in the next several weeks in southern Illinois and a little later in central and northern Illinois. Management can be obtained on early instar larvae with *Bacillus thuringiensis san diego* or *tenebrionis* (M-One, Trident, or M-Trak). Please give John Lloyd, (217)333-6651, or Tom Royer, (618)692-9434, a call before you treat if you find an infestation within the Champaign-Urbana or Edwardsville area.

Bronze birch borer adult emergence in Illinois is predicted to occur when *Spiraea X vanhouttei* finishes blooming. Chemical management should be initiated at this time and 3 weeks later to kill larvae as they hatch from eggs, before they burrow into the tree. Chemical recommendations for bronze birch borer control are listed in the 1995 *Illinois Urban Pest Management Handbook*.

True white grub adults have been flying for almost 2 weeks in central Illinois and should be emerging

from the soil at this time in northern Illinois. These beetles, which are present in relatively high numbers this year, can cause rather severe defoliation on young crabapples, ashes, and other trees. Refer to issue no. 2 (published April 26) for additional information.

Potato leafhoppers were present in alfalfa in the Collinsville area on May 11, as reported by Rick Weinzierl, Extension entomology specialist. They were not present 2 weeks earlier. Potato leafhoppers will feed for a short time on alfalfa; and then, commonly, many will move out of it and attack red maple, sugar maple, euonymus, and other ornamentals. Be watchful for these 1/8-inch long insects, and treat with pyrethroids as recommended in the 1995 *Illinois Urban Pest Management Handbook*. If untreated, they will distort the growing tips of red maple, producing damage similar in appearance to that caused by 2,4-D. They likely will be in central Illinois by May 20 and in northern Illinois by early June.

Lilac or ash borer will hatch as larvae as *Spiraea X vanhouttei* is in full to late bloom, according to Don Orton's book *Coincide*. Full bloom should occur in central Illinois about May 15 and in northern Illinois about the end of May. For additional information, refer to issue no. 3 of this newsletter (published May 10). (John Lloyd and Phil Nixon)

Pine Needle Scale

Pine trees with ready-made snow on their needles are not a new species; rather, the trees probably have an infestation of pine needle scale. Pine needle scale is a serious pest of mugo and Scotch pine and can be a problem on Austrian and red pine. The scales are insects that suck juices out of the mesophyll of the needles. This feeding damages the needles, leaving needles yellow and eventually turning them brown. Serious infestations can severely damage susceptible trees.

Pine needle scale is commonly identified as a white shell on the needles of infested pine. Eggs overwinter

underneath the shell and hatch in midspring. A “crawler” stage hatches from the eggs and disperses by crawling to new needles on the host plant or being blown by the wind to new hosts. After dispersing, crawlers settle down and begin feeding on the needles. Feeding scales create a hard, whitish shell that protects them from insecticides, weather, and predators. As female scales mature, they become legless white blobs under the shell. Male scales develop wings and look like tiny aphids. Mating occurs when the males emerge from their shells and fly around to impregnate the females, who remain in their shells. The male dies shortly after mating. Female scales begin laying small reddish eggs under the shell and then die. The eggs hatch into crawlers and disperse again in areas where there are two generations of scales per year, or they overwinter and hatch in the spring where there is one generation per year.

Pine needle scale crawlers are out in southern Illinois. They were first noticed at the latitude of Marion on May 6. The best time to manage this scale is during this crawler stage. The crawlers are susceptible to most insecticides, including insecticidal soaps and horticultural oils. Treatments should be initiated when most of the crawlers are active. This can be determined by beating infested branches against a white piece of paper. Little red dots moving around on the paper are most likely crawlers of pine needle scale. Crawlers generally begin to appear in central Illinois in mid to late May, and in northern Illinois in late May and early June. Scouting for crawlers should begin before and during this time period to determine when treatments should be applied. (*John Lloyd*)

Cankerworms in Northern Illinois

Be on the lookout for cankerworms on honey locust, elm, apple, linden, beech, oak, and other trees; they can cause considerable defoliation at this time of year. Populations have tended to be fairly large in some areas of northern Illinois, particularly in DuPage County, as reported by Susan Grupp, Unit educator in horticulture. Affected trees appear as if they are not properly leafing out. This is due to the leaves' being eaten by the caterpillars as they are expanding.

Cankerworms hatch shortly after budbreak on honey locust and several other species of trees. Cankerworms hatch from eggs that were laid in the fall or late winter, depending on the species. Adult cankerworms emerge from pupae (cocoons) in the soil. The male fall cankerworm moths are grayish, with a 1-1/2-inch wingspan. Female fall cankerworm

moths emerge as wingless, dark gray adults that climb up the trunks of host trees, commonly in the first half of November in northern Illinois. The male moths fly up into the trees to mate with them, and the eggs are laid shortly thereafter. Spring cankerworms emerge as similar winged males and wingless females in late winter, typically in late February or early March in the northern half of Illinois. The females walk up the tree and lay eggs on the twigs and branches.

The resulting eggs of both species hatch into slender caterpillars that vary from brownish or blackish to green. They have fewer prolegs than most caterpillars, causing them to “loop” when they crawl; this gait results in their frequently being referred to as loopers or inchworms. Prolegs are the false, short, jointless legs on the end of the abdomen of caterpillars, sawfly larvae, and some other insect larvae. Most caterpillars have five pairs, but spring cankerworms have two pairs. Fall cankerworms are said to have two and one-half pairs, with the third pair being about one-half as long as the other two pairs. When they crawl, cankerworms stretch out the front of the body and grab the surface with their six pairs of true legs just behind the head. Then they swing the back end of the body up to where the prolegs at the end of abdomen grasp the surface just behind the true legs. This causes the body to form a loop, which is straightened as the front of the body extends again to move forward.

Scout for cankerworms by sharply striking a suspected tree branch. Many of the cankerworm larvae will be jarred from the foliage and suspended on silk threads. The relative number of larvae that drop this way gives you an idea of whether or not treatment is necessary. Closer examination of heavily attacked foliage reveals the edges of many of the leaves or leaflets eaten away, with some of them being completely consumed.

The caterpillars are easily controlled with *Bacillus thuringiensis kurstaki* (Dipel or Thuricide) and other insecticides, as listed in the *1995 Illinois Urban Pest Management Handbook*. (*Phil Nixon*)

PLANT DISEASES

Black Knot of Plums and Cherries

This grotesque disease is serious but not very common because proper pruning and fungicide applications in commercial orchards are widespread. This year, however, we have seen several cases of advanced stages of the disease in home orchards and wild

settings. *Dibotryon morbosum*, the causal fungus, can infect at least two dozen species of cherries, plums, and other members of the *Prunus* genus, including some ornamental species.

Black knot is fairly easy to diagnose. Elongated, rough, girdling, black swellings develop on twigs, branches, and even the trunk. The knots are a velvety olive green in the spring. They gradually become hard, brittle, and coal black. If stems become girdled, dieback is evident. The trees gradually weaken and may die unless effective control measures are taken.

Purchase only disease-free nursery stock. Never buy trees with visible knots or abnormal swellings on the twigs and branches. Look for this disease in its early stages, which appear as light brown swellings that later rupture the bark and turn darker. Prune and burn (or bury) all infected wood in late winter or early spring before growth starts and as soon as new knots appear. Make cuts 4 to 8 inches behind any obvious, black-knot swellings. Knots on the trunk or on large limbs should be carefully cut out with a knife and chisel, removing about an inch of healthy bark and woody tissue beyond any visible gall tissue. If possible, destroy (burn) all available wild, neglected, or worthless plum and cherry trees.

Commercial fruit growers rely on timely fungicide applications, as well as pruning, to control black knot. Most infections occur between budbreak and 2 weeks after bloom, when wet conditions are accompanied by temperatures of 55° to 77°F. Fungicide sprays should be applied as buds break and continued every 2 weeks until about 3 weeks after petals fall. These early season fungicide sprays do much to prevent new infections but are not effective in stopping infections already present. For this reason, all visible knots should be pruned from the trees.

For more information concerning control measures, resistant cultivars, and disease cycle, consult *Report on Plant Diseases*, no. 809, "Black Knot of Plums and Cherries." (Nancy Pataky)

Anthracnose Sighting

In issue no. 2 of this newsletter, we discussed anthracnose of trees. The disease has been reported in southern Indiana, where it is causing defoliation of sycamore trees. This information suggests that we will be seeing the same problem in central Illinois in about a week or so. Remember, infection is dependent on cool, wet conditions for the 2 weeks after budbreak.

Such conditions have been commonplace lately in Illinois.

We are not advocating chemical applications (refer to issue no. 2). All that you can do is promote tree health to help new leaf production. New leaves likely will emerge in warmer, drier weather; and infection should not recur. (Nancy Pataky)

Hollyhock Rust

Hollyhock plants do not have many disease problems, but one frequent invader is rust, caused by the fungus *Puccinia malvacearum*. It is not uncommon to find the disease severe in the spring and autumn but declining in midsummer drought. We have seen the colorful sporulation of this disease already this season.

Severely rusted leaves turn yellow, wither, and drop early. Plants may become ragged in appearance, but rarely do they die from a rust infection. Rust first appears primarily on the undersides of the lower leaves as lemon yellow to orange, almost waxy pustules that turn reddish brown to chocolate brown with age. Larger, bright yellow to orange spots with reddish centers develop on the leaf surface opposite the pustules. The rust quickly spreads to other leaves, stems, and flower bracts. In humid weather, rust continues to spread from leaf to leaf until the entire hollyhock plant becomes infected and loses its leaves one by one.

This rust is a bit unusual. It is microcyclic, producing only teliospores and basidiospores. There is no alternate host necessary for the disease to occur.

The first rusted leaves should be picked off and destroyed. As soon as flowering is over, all rust-infected hollyhock leaves and stalks should be collected and then destroyed by burning, burying in a compost pile, or hauling away with the trash. Because rust may survive the winter on mallow weeds, they also should be removed.

In cases where disease control cannot be maintained with sanitation, preventive fungicides may be used, starting when new growth begins in the spring. All aboveground parts of the plants should be covered, and five or six applications are necessary at 7- to 10-day intervals. Chemicals registered for this use include chlorothalonil, mancozeb, sulfur, Bayleton, and Domain. Check the labels for current registrations, rates, and timing. (Nancy Pataky)

HORTICULTURE

Roundup, Finale, and Gramoxone for Postemergence Weed Control

These postemergence herbicides control a broad spectrum of weed types. However, as can be seen from the table, these products have many differences. A primary difference is in mode of action. Roundup is systemic and therefore works by moving throughout the plant—including the underground root system—to kill the entire plant. Finale and Gramoxone are

burndown herbicides that act quickly, do not move throughout the entire plant, and require thorough spray coverage to achieve control. Plants can resprout when sprayed with contact herbicides if they have extensive root systems. Therefore, Roundup is the preferred treatment to control perennial weeds or other weeds with extensive root systems.

In an effort to get “the best of both worlds,” many people ask about mixing Roundup and Finale to achieve quick burndown along with systemic activity. Tank mixing is not specified on the product labels, and therefore more work is needed to explore this option. (*Rhonda J. Ferree*)

	Roundup (glyphosate)	Finale (glufosinate-ammonium)	Gramoxone-Extra (paraquat)
Mode of action	systemic	contact	contact
Spectrum of activity	nonselective	nonselective	nonselective
Injury occurs in . . .	7-14 days	2-4 days	a few hours
Rainfast time	6-8 hours	4 hours	30 minutes
Color	clear, amber-colored	blue to bluish green	dark green
Signal word	WARNING (eye irritant)	WARNING (eye irritant)	DANGER-POISON
Skin-irritation potential	non-irritant	mild irritant	irritant
Odor	slight amine odor	weakly pungent	strong, pungent odor
Tank specifications	corrosive to steel	any type	corrosive to aluminum
Soil residual activity	none	none	none
Soil adsorption	strong	moderate	strong
How it breaks down	microbial activity	microbial activity	microbial activity, sunlight
Soil half-life	< 60 days	7-20 days	16 months-13 years
Groundwater label advisory	no	yes	no
Formulation	solution, soluble dry pak	solution	solution
Use classification	general use pesticide	general use pesticide	RESTRICTED USE PESTICIDE

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No. 5 • May 24, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

The brown race of oystershell scale crawlers is appearing in central Illinois on apple, dogwood, and other hosts.

Pine needle scale crawlers have settled down and molted in southern Illinois, making it too late to achieve meaningful control with insecticides. They were seen hatching in northern Illinois on May 16, according to Don Orton, Illinois Department of Agriculture (IDA). Crawler sprays should be effective throughout the northern third of the state.

Cooley spruce gall aphid is reported by Orton as being present in northern Illinois as black nymphs on Douglas fir. Control with sprays of acephate (Orthene), diazinon, or cyfluthrin (Tempo). Treatment will probably not be effective on spruce because the galls should be formed already.

Elm leaf beetle eggs will be hatching in central Illinois. Treatment can be applied at this time in central and southern Illinois.

Potato leafhoppers are present in central Illinois on alfalfa. They should soon move to red maple in both southern and central Illinois. Keep a watch for them on the host and on lighted windows at night in residential areas. They are 1/8 inch long and lime green.

Lilac or ash borer should be treated at this time in central Illinois, as the larvae are hatching from the eggs.

Squirrels are being reported in several areas of the state as being particularly bothersome this year on trees. They nip off the last 4 to 12 inches of the terminal growth on various evergreen and deciduous trees. Although these tips may litter the ground, the effect on the tree is usually minimal. Small trees that are being heavily attacked can be sprayed with thiram, sold as Rabbit and Deer Repellent. This will repel the squirrels for about 2 weeks. Check the label to be sure that it can be sprayed on the tree in question.

Inland floodwater mosquitoes usually emerge as biting adults after about 14 days of warm conditions following heavy rains. With the heavy rainfall experienced lately in Illinois, and the predicted warm temperatures over the next few days, we should be in for heavy mosquito numbers for Memorial Day. (*Phil Nixon*)

Pine Shoot Beetle

Spring mating flights of the common pine shoot beetle have occurred in Illinois and Indiana already this spring. The peak of the spring mating flight of the common pine shoot beetle occurred on March 12, which is at least a week earlier than has been recorded in previous years. Despite an early overwintering adult flight, cool weather in April slowed new larval development in Illinois, Indiana, and much of Michigan. The first-brood adult flight should be expected in early June, as in previous years.

Common pine shoot beetle adults overwinter in hibernation sites at the base of trees. In early spring, when temperatures reach about 54°F, overwintering adults begin searching for suitable host material. Fresh pine wood (cut pine stumps and log piles) with thick corky bark and weakened or dying trees are colonized by the beetles. After mating, overwintering female beetles lay eggs in galleries in the inner bark. Larvae hatch and feed in the cambium from April to June. Most beetles stay in the logs until June 1, when

the new brood of beetles emerges from logs and flies to shoot tips.

Newly emerging adult beetles join the parent generation that has already begun shoot feeding on Scotch, Austrian, mugo, jack, red, and white pines. Beetles tend to prefer feeding on smaller trees, although shoot feeding can occur in the crown of living trees of any age. The parent generation feeds primarily in last year's shoots, whereas new adults bore into current and older shoots. Adults tunnel toward the tips in shoots approximately 5 mm in diameter. Feeding continues until late autumn, when beetles leave the shoots in response to cold weather. Most damage is caused by shoot feeding. Shoot damage becomes visible in June.

Management practices for pine shoot beetle include destroying stumps, slash, and trap logs prior to the June 1 flight of the new brood. If provided with suitable host material (trap logs) for the beetles, overwintering adults and new brood larvae can be captured and destroyed. The use of trap logs greatly reduces pine shoot beetle populations in infested areas. According to Drs. McCullough and Smitley of Michigan State University, some remedial chemical control can be obtained by using a mix of Orthene (acephate) and pyrethroids after beetles have entered the shoots. Pyrethroids labeled for pine are cyfluthrin (Tempo), bifenthrin (Talstar), or permethrin (Ambush or Pounce), although permethrin may be used only in nurseries. This won't help with inspections in the fall, however, because a shoot with no beetle or a dead beetle will quarantine a field just as fast as a shoot with a live beetle.

Lindgren funnel traps used to determine the presence of pine shoot beetles have been placed in the following 19 Illinois counties: Boone, Champaign, DeKalb, Ford, Grundy, LaSalle, Lee, Marshall, McLean, Ogle, Pope, Putnam, St. Clair, Jackson, Johnson, Union, Vermilion, Winnebago, and Woodford.

According to Rebecca Keith, USDA/APHIS/PPQ, visual surveys are set to begin shortly from Champaign County northward. Routine nursery/Christmas tree inspections will be conducted in the rest of these counties. (This information was provided by Cliff Sadof, Purdue University, and Charles Helm, Illinois Natural History Survey.) (John Lloyd)

Elm Leafminer Adults Are Out!

The adult elm leafminer is a small (1/8-inch long) black sawfly that commonly lays eggs in the leaf tissue of American, English, Scotch, and Camperdown elms.

Presently, adults in northern Illinois are laying eggs in the leaf tissue, resulting in yellow spots approximately 1/8 inch in diameter. The eggs hatch into small, legless larvae, which begin mining the leaf. Feeding continues until approximately mid-June, at which time the larvae chew their way out of the leaf and drop to the ground. They burrow to a depth of approximately one inch, pupate, and then overwinter. There is one generation each year.

Leafmining can be extensive, with five or six larvae per leaf. These mines eventually coalesce into a large blotch. Trees heavily infested with elm leafminer will have leaves that appear scorched and may prematurely drop. Normally, leafmining causes only aesthetic damage; but, on specimen trees or trees that constitute a major focus in the landscape, control may be necessary.

Control of the elm leafminer may be achieved by applying a foliar spray of an insecticide. Once the larvae begin mining, contact insecticides are not effective. Contact insecticides that should be effective include diazinon, chlorpyrifos (Dursban), and cyfluthrin (Tempo). (Fredric Miller, IPM Extension Educator, Countryside Extension Center, and Phil Nixon)

Peach Tree Borer

Peach tree borer attacks the base of older trees in the genus *Prunus*. Damage appears as tunneling activity just under the bark of peach, nectarine, apricot, plum, cherry, and their landscape relatives, such as purple-leaf plum and flowering cherry. As a result of the damage, large amounts of gummy pitch are exuded at the soil level. To obtain control, spray the base of landscape plants with chlorpyrifos (Dursban) when newly hatched larvae are present. Repeat the application one month later. The eggs hatch as *Spiraea X vanhouttei* is ending its bloom, with mostly brown blossoms and a few white ones still present (according to Don Orton's book *Coincide*). On fruit trees, spray the base of the trunk with a single application of Lorsban, which is the form of chlorpyrifos labeled for edible crops. Follow the pesticide label on the number of sprays and harvest restrictions. (Phil Nixon)

PLANT DISEASES

Updates

The crabapples have completed blossoming now, and varieties susceptible to apple scab have begun to look quite poor. Conditions have been ideal for scab infection, and we are receiving reports of visible scab lesions throughout the state. Fungicide sprays now will be ineffective in controlling the fungus. (See issue no. 3.)

Most of the sycamores in central Illinois look as though they are just leafing out. Look more closely, and you will see that they have been severely hit with anthracnose (as was predicted). It may be several weeks before we see sycamores with healthy leaf growth. Anthracnose has also been reported on some maples and a few ash trees in the central part of the state.

There have been several additional cases of pine wilt on Scotch and Austrian pines over the last 2 weeks. Early confirmation of these cases will encourage rapid removal of the trees and (I hope) help to break the disease cycle and spread by the Sawyer beetles. (Nancy Pataky)

Phomopsis Blight of Juniper

During prolonged warm, wet periods in spring and early summer (and again in late August and September), this fungal disease is particularly damaging to junipers. We have also seen it on arborvitae; and it has been reported on true cedar, false cedar, European larch, jack pine, English yew, Japanese plum yew, Douglas fir, and fir. The disease is caused by the fungus *Phomopsis juniperovora* and is typified by progressive dieback of new shoot growth. In more severe cases, entire branches die. Eventually, small, pinhead-sized black pycnidia (fungal fruiting structures) form in the dead tissue.

On juniper and arborvitae, we sometimes see another fungal disease, known as *Pestalotiopsis*. It also produces black fruiting structures in the dead tissue but is a common secondary invader. It infects injured areas of any sort, such as winter-injured tissue or desiccated areas. *Pestalotiopsis* does not cause the death of the tissue itself. *Phomopsis* kills the tissue and is found only on the newest growth.

The ideal control of this fungus would be to plant a resistant juniper. Many of these are listed in *Report on Plant Diseases*, no. 622, "Phomopsis Twig Blight of Juniper." If your planting is established, prune out

and burn or remove blighted parts. Pruning, however, stimulates more new growth, which is susceptible to the fungus, especially in wet weather. For this reason, restrict pruning to drier periods, such as late June through early August.

Specific cultural control recommendations for this disease in nursery operations are listed in *RPD*, no. 622. Whether in nursery or landscape plantings, chemical controls can be effective when applied at the right time. Begin at budbreak, and spray with a fungicide every 7 to 10 days for nurseries, or every 10 to 14 days for landscape plantings. The object is to protect new growth, so you may need to apply sprays when flushes of new growth appear in the summer and early fall, or in response to pruning. Fungicides registered for Phomopsis blight control on juniper include Zyban, Cleary 3336, and mancozeb. There may be others. Be sure to read the labels carefully. (Nancy Pataky)

Cedar-Apple and Related Rusts

Cedar-apple rust has made its usual showy appearance this spring, with yellowish, gelatinous horns on otherwise brown galls located on eastern red cedar (*Juniperus* species). Galls seem to be more plentiful than usual this year on the juniper hosts. These rust diseases are commonly found on red cedars (*Juniperus* species) in Illinois: cedar-apple rust, cedar-hawthorn rust, and cedar-quince rust. The type of gall formed on the juniper host helps in distinguishing the rust disease. These rust diseases require more than one host plant to survive. Part of the life cycle occurs on the juniper and part on the apple, crabapple, hawthorn, quince, or other suitable alternate host.

The masses of spores on the cedar galls are spread to newly emerging apple, crabapple, and hawthorn leaves and fruit. Spores develop on these trees by midsummer and are carried by the wind back to cedar and juniper. Cedar-quince rust is similar except that galls on eastern red cedar and other junipers are small and spindle-shaped. The quince rust can affect apple, crabapple, hawthorn, quince, mountain ash, and cotoneaster. The fruit may become stunted, and twigs swollen and distorted.

On red cedar hosts, prune affected branches 6 to 8 inches below galls, in dry weather only, using sterilized pruning tools (dipped in 10 percent Clorox or 70 percent rubbing alcohol). Cultivars of crabapple and other rosaceous plants with resistance to rusts are available. Fungicides may be used on a protective basis, as described in the *1995 Illinois Urban Pest*

Management Handbook. Chemical control, however, is costly and requires frequent applications. Sprays to susceptible junipers must be initiated in early July and made 10 to 20 days apart for a total of four sprays. Details concerning cedar-apple and related rusts, including lists of resistant varieties, are in *RPD*, no. 802. Pictures of these diseases can be found in photo sheets entitled "Apple Diseases I" and "Tree Diseases II." (Nancy Pataky)

Dogwood Flower and Leaf Blight

The clinic has had reports of dogwoods that leafed out and flowered beautifully but are now showing brown, rotted flowers and leaf tips. We have worked with a few of these samples in the lab and find *Botrytis* to be present. The disease is a flower and leaf blight, not the dreaded dogwood anthracnose that we are all watching for in Illinois.

Botrytis causes fading of the flower bracts, as well as a rot of the leaves, especially the tender new growth. It infects during extended cool, rainy weather. The minimum time required for infection is about 20 hours when plant surfaces are wet, a requirement easy to meet this spring. Although there are chemicals available that protects against *Botrytis*, the window for applying such materials is past. When conditions dry, remove dead material from the site as much as possible. There should be no permanent injury to the tree. (Nancy Pataky)

HORTICULTURE

Worker Protection Standard

By now, many of you have heard about the revised Worker Protection Standard (WPS) for agricultural pesticides and might wonder if and how it affects you. The WPS affects only persons who produce an agricultural plant on a farm, forest, or nursery or in a

greenhouse. If you use pesticides to produce those plants and employ anyone to help you (even part-time), you must comply with this rule. I suspect that most readers of this newsletter are exempt from this rule because it does not apply to those who maintain plants only in landscapes or on golf courses. If, however, you apply pesticides to plants held in an area before planting, you may need to comply. Some garden centers are affected in this way.

The entire WPS is label-driven. The labels on products used in the production of agricultural plants will contain statements indicating that the user must comply with the WPS and all of its provisions. Provisions are meant to protect two groups of employees, agricultural workers and pesticide handlers, and include training, worker notification, decontamination sites, personal protective equipment, emergency assistance, and restricted-entry intervals.

If you are affected by this rule and need more information, pick up a *How to Comply* manual from your local Extension office. For additional information, contact Rhonda Ferree, (217)244-4397, or Tom Walker from the Illinois Department of Agriculture, (217)785-2427.

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

Major authors are Phil Nixon and John Lloyd, entomology, (217)333-6650; Nancy Pataky, plant pathology, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulture, (217)333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. The editor is Mary Overmier, and the typesetter is Oneda VanDyke, both of Information Services.

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No. 6 • May 31, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

The brown race of oystershell scale crawlers has settled down in central Illinois, and further sprays are not likely to be very effective. Sprays should be effective in northern Illinois and on the banded race on lilac in central and northern Illinois.

Euonymus scale crawlers should be out in central Illinois and should appear in about a week in northern Illinois.

Reports of cankerworms attacking oak trees are coming in from the Rockford and the Chicago areas. Light infestations are not harmful to tree health, but indications are that some infestations are severe. Cankerworms eat entire leaves, leaving only the midrib. Control with *Bacillus thuringiensis* var. *kurstaki* (Dipel or Thuricide) should be initiated when the larvae are young, as the leaf buds are opening in the spring. Other recommendations are listed in the *1995 Illinois Urban Pest Management Handbook*.

Mimosa webworm first-generation larvae should be out in southern Illinois. Moths should be flying in central Illinois at this time, with treatable larvae being present in a week or two. No larvae are present yet in central Illinois. (Phil Nixon and John Lloyd)

Birches and Bronze Birch Borer

Reports from the field indicate that bronze birch borers are emerging in central Illinois. This conforms to the predictions made by Don Orton in *Coincide* that

emergence of bronze birch borer occurs around the time that *Spiraea vanhouttei* finishes bloom. Adult beetles will continue emerging for a period of weeks. After emerging, the adults feed on the leaves of birch and other trees in the vicinity. Adult feeding doesn't cause discernible damage. Male and female beetles will mate, and the females produce and lay eggs in rough areas of bark and branch crotches. Larvae then hatch from the eggs and burrow into the tree, where they feed on the phloem and cambium. Larval feeding restricts the translocation of nutrients within the tree. Larval galleries can girdle large branches and eventually may kill the entire tree.

Because the time of egg laying and hatching is somewhat protracted, treatments aimed to control the newly hatching larvae before they burrow into the bark of the tree rely on several treatments with a residual (long-lasting) insecticide. The plan is to cover the trunk and branches with an insecticide all during the time that eggs should be hatching, thus preventing infestation. Our recommendations for chemical control of bronze birch borer can be found in the *1995 Illinois Urban Pest Management Handbook*. Chlorpyrifos (Dursban) applied to the trunk and major limbs of the tree three times at 2-week intervals is one of them. However, the battle against the borer will not be won exclusively with chemical control.

The best way to prevent problems with bronze birch borer is through prevention. Bronze birch borers are attracted to unhealthy (low-vigor) birch trees. The best way to stress a tree and make it attractive to pests is to plant the wrong tree in the wrong place.

White-barked birch are not native to most locations in Illinois and thus are not suited to the local environment. Additionally, they require quite a bit of moisture to survive anywhere they are located. The first plan of prevention is to select a birch variety that has a decent chance of surviving in our area. River birch, *Betula nigra*, is native to Illinois and as its name indicates is most commonly found near rivers. Al-



though the river birch has an orange-brown flaky bark and not the white bark that many people desire, it is hardier in Illinois and less susceptible to bronze birch borer than its white-barked cousins. Even so, it requires water; and, in dry situations, it may require frequent watering. The 'Heritage' cultivar of river birch, as indicated in the *Manual of Woody Landscape Plants* by Michael Dirr, has lighter bark and, again, may be better adapted to our climate. There are efforts under way at several institutions to develop hardy cultivars of white-barked birch trees that are less susceptible to bronze birch borer.

Birches are fast-growing trees, and as such they have a relatively short life span (treewise) in urban landscapes. After any birch is planted, good horticultural practices should be used to maintain its vigor, reduce its attractiveness to bronze birch borer, and prolong its existence. Mulching and watering are necessary in most landscape situations.

If an infestation of bronze birch borer is suspected, look for common identifying factors. The initial symptom that people notice is branch dieback. This usually begins at the top of the tree. That does not suggest that the infestation is in the top of the tree but that the translocation of nutrients has been restricted, resulting in branch dieback. Raised ridges in the bark are another symptom of bronze birch borer attack. The ridges are callus tissue made by the tree's trying to cover a gallery (feeding tunnel) made by the borer larvae. Pruning below these larval galleries may reduce an existing infestation. Proper pruning procedures (natural target pruning, or conventional pruning at branch junctions) should be followed. Improper pruning can cause additional stress to the tree. It has been suggested that pruning wounds may be attractive to beetles; however, if a tree is under stress, pruning wounds will not make it any more attractive than it already is. Holes that are D-shaped on main branches and/or the trunk of a tree indicate that adult beetles have emerged from the tree. Trees on their last legs should be removed to prevent infestation of adjacent trees. (John Lloyd)

Birch Leafminer

New mines of the birch leafminer were identified on paper birch research plots in central Illinois on May 19. This insect is a common problem in northern Illinois, and trees with a history of infestation should be monitored. A systemic insecticide such as acephate (Orthene) or dimethoate (Cygon) applied when the first mines appear and 10 to 12 days later should

provide effective control of the leafminer and prevent further aesthetic damage. Other management recommendations for birch leafminer are listed in the 1995 *Illinois Urban Pest Management Handbook*.

Birch leafminer, introduced from Europe, is a pest on gray and paper birch. River birch is rarely infested with this particular leafminer. Birch leafminer adults (little wasps) appear when the birch leaves are half-grown and lay individual eggs on the new leaves. There may be several eggs laid individually on a leaf. The eggs hatch and the young, flattened larvae begin feeding on the tissue between the leaf surfaces. Over time, the mines created by the larvae may join together and form a blotch. The birch leafminer larvae feed only on new leaves on vigorously growing trees. For this reason, one-time defoliation does not severely affect tree health. When the larvae mature (in 10 to 15 days), they chew a hole in the leaf and drop down to the ground to pupate. The second-generation adults emerge 2 to 3 weeks after pupation occurs, when the new crop of leaves has developed. They lay eggs on the new leaves and repeat the cycle again. There are three or four generations of birch leafminer each year. The last generation overwinters as full-grown larvae in earthen cells 2 to 3 centimeters below the surface of the soil. (John Lloyd)

Honeysuckle Aphid

Although honeysuckle aphid overwinters as eggs in old witches-brooms and at the base of the plant, insecticide control efforts are not likely to provide meaningful control until aphid populations build up enough to cause damage. Plants sprayed before that time are easily reinfested by additional winged forms, making early treatments meaningless. Don Orton, Illinois Department of Agriculture inspector in northeastern Illinois, reports damage consisting of wrinkled, folded leaves with large numbers of aphids inside the folds.

Honeysuckle aphid attacks various varieties of tatarian honeysuckle, particularly zabeli honeysuckle, from Effingham north through the state. Damage is caused by the aphids' sucking the sap out of the leaves, killing them, and causing lateral buds to break and form new stems with leaves. As each successive wave of stems and leaves is killed by the aphids' feeding, a twiggy mass of growth with small, immature leaves develops at the growing tips of the plants (witches-brooming). Witches-brooms that are not killed by aphids by fall winter-kill because the foliage has been recently produced and not hardened off for

winter. This results in an unattractive plant that is unable to grow because the new growth is killed off.

Several resistant varieties are available on which the aphids do not appear to survive. Among large bush forms similar to zabeli honeysuckle, Arnold's red honeysuckle is resistant and readily available in nurseries. Several other varieties also have been identified to be resistant. The smaller bush forms, such as Clavey's dwarf, also are resistant. In fact, few honeysuckles appear to be damaged by this aphid. As luck would have it, the most heavily damaged honeysuckle also happens to be one of the most heavily planted varieties in the past, zabeli honeysuckle.

Chemical control can be achieved by spraying the growing tips of the bushes two or three times at monthly intervals, starting now. Spraying can be stopped when the foliage appears to be mature and subsequent aphid populations do not cause leaf folding and red streaks. (Phil Nixon)

Two-Year White Grubs Out

The true white grub is actually a genus, *Phyllophaga*, of scarab beetles consisting of many species that occur in Illinois as well as other localities in the world. Many of the most common species have 3-year life cycles and thus are called 3-year white grubs. Several species have 2-year life cycles, and some are known with one-year life cycles. *Phyllophaga tristis*, a species that has a 2-year life cycle, is very common at this time in central Illinois.

This is a smaller species that is about the same size and color as the masked chafers, or annual white grubs, that are our main turfgrass pests in Illinois. *P. tristis* is about one-half inch long and medium brown as an adult May beetle. As do other *Phyllophaga* species, this species feeds as an adult, being known to feed only at night on oak tree foliage.

Oak trees that have the edges of the leaves eaten, or the entire leaves eaten away except for the major veins, with no pest being seen during the day, may be under attack by this beetle. Checking on the tree at night (10:30 p.m. is a good time) may reveal the presence of large numbers of these beetles eating the foliage. They are likely to be very active on warm, dry nights, being less active on the rainy nights that we have been experiencing.

You are likely to notice smaller trees to be more heavily attacked than larger trees. Larger trees usually have major damage only on the lower branches. This may be due to the beetles' being more active close to the ground and rarely flying very high. Unlike the

masked chafers that do not feed and that die within a couple of weeks, these beetles are likely to be out for several weeks, continuing to feed on oaks. Treatment with carbaryl (Sevin) or other insecticides effective against chewing insects should be effective controls. (Phil Nixon)

Viburnum Borer

Young viburnums are attacked by several species of borer that tunnel in the cambium area just under the bark. White legless larvae that are about one inch long when mature feed from just above the soil line to several inches below it. Heavily attacked stems have little or no bark in many areas, with deep grooves eaten through the underlying wood. Above ground, the bushes are unthrifty, with slowly growing or dying shoots.

Adult borers emerge as clear-winged moths from holes in the stems at or near the soil line. These relatives of peach tree borer and ash/lilac borer look like wasps. According to Don Orton's *Coincide*, after the adults mate and lay eggs, the eggs hatch into larvae that tunnel into the shrub at mock orange, *Philadelphus*, bloom, which is occurring now in central Illinois. Sprays of chlorpyrifos, sold as Dursban, are effective at egg hatch if applied heavily to the base of the bushes.

Several species of viburnum are attacked, but *Viburnum opulus compacta* appears to be the most heavily attacked. Once the bushes become established or after they get older, they appear to be less commonly attacked. It is common to find old exit holes at the base of older, established viburnums with no trace of active infestation. (Phil Nixon)

PLANT DISEASES

Peach Leaf Curl

This foliar disease has been reported throughout Illinois on peach trees and foliar ornamental flowering species of *Prunus*. Plum pockets deforms the fruit and is caused by a closely related fungus (both are *Taphrina* species) but is not as widespread or as serious as peach leaf curl. The Indiana Plant Clinic recently reported one case of plum pockets.

Peach leaf curl causes very obvious symptoms of leaf puckering, distortion, and thickened, crisp growth. The leaves curl downward and inward within a month after full bloom. The leaves are often red or purplish rather than the normal green. Later, the upper

leaf surface is covered with a grayish white, velvety spore layer. Some people confuse these symptoms with the distortion caused by plant-growth regulator herbicides. If herbicides are to blame, other broadleaf species should also be injured.

The causal fungus infects in the cool, moist weather of early spring, from bud swell to bud opening (with an ideal temperature of 50° to 70° F). Because the weather so far this spring has been cool and wet, the disease may have already become obvious to many growers.

The good news is that the disease is unlikely to kill the tree. It causes the first set of leaves to drop, but the tree produces new leaves that should be disease free due to the warmer temperatures. Homeowners can help their trees by maintaining fertility and watering as needed. The idea is to keep the tree healthy and vigorous so that it can put out new leaves. Fruit production and quality may also be reduced.

A single dormant-fungicide spray would have controlled this disease. Ferbam, Bravo, or Bordeaux mixture, if applied before bud swell, provides perfect control of leaf curl for the commercial grower. Homeowners should consult the *1995 Illinois Urban Pest Management Handbook* for specific crop recommendations.

Autumn sprays after the majority of the leaves have fallen or spring sprays applied 3 to 4 weeks before bud swell are effective. Once the fungus enters the leaf, the disease cannot be controlled, so using fungicides now will not help against this disease. Growers who did not spray a dormant fungicide may see peach leaf curl this year. Consult *Report on Plant Diseases (RPD)*, no. 805, for more on peach leaf curl. (Nancy Pataky)

Verticillium Wilt

The *Verticillium* fungus has become active in trees. The lab has confirmed cases of verticillium wilt on maple. The symptoms include wilting, yellowing, and death of the leaves of affected branches. Also, a diagnostic brown or dark green discoloration of the vascular tissue appears as a streaking of the wood just below the bark. It can be seen readily when the bark is peeled back with a knife. Be sure to check all the way around an affected branch to be certain that you have not missed the discoloration. It is best to check a branch that has symptoms, is still alive, and is about as thick as your thumb. If laboratory confirmation is desired, send branch sections as just described and about 6 to 8 inches long. Samples can be cultured in the lab to isolate the causal fungus.

The *Verticillium* fungus is soil-borne and can survive in the soil for many years. For this reason, it is important to identify the disease so as not to replant a susceptible species in the same spot. Unfortunately, *Verticillium* can infect many different plants in many different plant families. The host range includes trees, shrubs, ground covers and vines, vegetables, field crops, fruits, herbaceous ornamentals, and many weeds. For a detailed list of hosts, as well as suggested replacement species, consult *RPD*, no. 1010.

No fungicide that can control this fungus is available to the homeowner. Cultural control measures may be helpful. Prune as much dead wood as possible. Try to help the tree regain vigor by keeping it well watered and fertilized. Because the fungus primarily moves up the tree, and the vascular tissue is produced horizontally, some species can grow quickly enough to "wall off" the fungus. For this reason, the disease may be contained in one section of the tree. If the tree is stressed, the fungus may spread to the rest of the tree.

For details concerning verticillium wilt, consult *RPD*, no. 1010. For a photo, see the picture sheet entitled "Tree Disease II." (Nancy Pataky)

Tulip Fire or Botrytis Blight

This fungal disease attacks all parts of the tulip plant, including the bulbs. Once the tulip bed is infested, the disease generally becomes more serious in succeeding years. It is particularly evident in cool, wet springs such as we have experienced this year. The last time we saw this much *Botrytis* was in 1993, the year of the floods.

The first symptoms may be the appearance of a few stunted, twisted plants known as fireheads. These result from bulb infections the previous year and serve as the primary source of infection for the current year. In cloudy, wet weather, these plants are covered with a gray mold of the *Botrytis* fungus, the causal organism of the disease. Yellowish brown spots appear on nearby leaves, flowers, and stems. The telltale gray mold may follow. Sometimes the stems collapse, and the plant dies. The fungus also can penetrate the bulb and cause a bulb rot; or it may cause lesions on the bulb, then go undetected, allowing the diseased bulbs to be planted the following year.

The first reaction by the grower may be to use a fungicide. Although many are labeled in Illinois for such use (page 123, *1995 Illinois Urban Pest Management Handbook*), they are used as protectants,

beginning when leaves emerge from the ground. The fungicides do not work as rescue treatments.

For the best disease control, dig the bulbs in dry weather (remember what that was?) and not later than 3 weeks after the petals have fallen. Remove the stems, and handle the bulbs carefully to avoid bruises. Discard all diseased, bruised, and cut bulbs before storage and again before planting. If possible, do not plant tulips in the same area for more than 3 years consecutively, especially if you have a problem with *Botrytis*. This organism is able to survive in resting spores in the soil and on debris for about 2 years. For details concerning this disease, consult *RPD*, no. 609. (Nancy Pataky)

Dogwood Anthracnose

The following describes a disease that we need to watch for in Illinois, but which has not yet been identified. This problem is much more serious than botrytis blight.

Dogwood anthracnose, also known as *Discula* anthracnose, is a fungal disease that can kill flowering dogwood. The disease has been a problem primarily in eastern and northeastern states, but it is also a major problem in Tennessee and Kentucky. It appeared in Indiana in 1993. So far, Illinois has not had a confirmed case of dogwood anthracnose. If it occurs, it most likely is introduced through plant sales and not as a natural occurrence.

In Illinois, we have a minor leaf-spot disease called spot anthracnose. Symptoms of spot anthracnose occur on flower bracts, leaves, young shoots, and fruit. Look for small, reddish purple leaf spots that are circular to elongated and about the size of a pinhead. As the disease progresses, the spots merge and may appear larger. The centers of the spots turn yellow to gray. Spot anthracnose does not usually cause significant damage.

Dogwood or *Discula* anthracnose is the disease to watch for in Illinois. The spots occur in May and have tan centers with purple borders, the same as spot anthracnose. However, leaves become blighted, gray, and droop on the tree. These leaves hang on the twigs, rather than dropping off. This fungus moves from the leaves into the twigs and branches, causing their death. Many water sprouts then develop at the base of the tree or on the trunk.

Discula anthracnose leaf spots can be identified by turning the leaves over and looking for numerous small brown dots that are the conidiomata, or spore-producing structures of the fungus. The spores are washed by rain in cool, wet weather to nearby trees.

These spots, along with numerous water sprouts, stem cankers, and dead foliage hanging on stems should indicate the presence of *Discula* anthracnose.

If you have a suspected case of this disease, there are some control remedies we recommend. First, send your sample to the Plant Clinic; we will work to identify the exact disease present. We also can provide reference materials produced by states where this is a problem. Flowering dogwoods still have their place in the Illinois landscape. One researcher states that lawnmower and weed-eater damage poses a more significant threat to flowering dogwoods in the urban landscape (with exceptions under specific circumstances) than anthracnose ever will. Maintain your dogwoods in good vigor, and keep an eye out for the symptoms discussed here. (Nancy Pataky)

HORTICULTURE

Label Changes

Although product labels are constantly changing, many have significant changes this year due to the revised Worker Protection Standard (WPS). Even if you are not affected by the WPS (see last week's article), you still may need to follow some label changes. Pesticide label improvements required to meet the WPS include a WPS statement, a Spanish-language statement, personal protective equipment (PPE) specifications, notification requirements, and restricted-entry intervals (REI).

Agricultural use requirements. The WPS statements are found in the directions-for-use section of labels in an "Agricultural Use Requirements" box. Persons affected by the WPS must read and follow information in this box, including reference to WPS provisions not specified on the label, REIs, double-notification requirements, and early entry worker PPE requirements.

Nonagricultural use requirements. Some products are used both by persons affected and those not affected by the WPS. When that happens, the label is split between agricultural and nonagricultural uses. If you are not affected by the rule, you need to follow only the nonagricultural use requirements. This generally means that the REI and notification requirements are not as specific. Remember, when no REI is given, the "rule of thumb" is to wait until the sprays have dried and the dusts have settled.

Personal protective equipment. Personal protective equipment requirements for pesticide handlers are

found in the precautionary statements section of labels. Everyone must wear the PPE listed on pesticide labels. PPE requirements are now very specific. They tell you exactly what equipment to wear and what material types to choose.

Labels are long, detailed, and arranged differently depending on the manufacturer. All labels, regardless of manufacturer, have three major sections: product information, precautionary statements, and directions for use. Think about what you need to locate, and pinpoint it to a particular section. Names and numbers are found in the first part of labels in product informa-

tion. Information about potential hazards that products may have, including the PPE to use, is found in the precautionary statements. The directions for use makes labels very long, but you need not read them all. Read only the directions for the crop or area you are working in. If you do not find that crop or area, then you cannot legally use the product there.

Remember, **the label is the law!** If you have any questions about a pesticide label, get some help by calling a chemical company representative, local Extension office, or chemical dealer. Re-read the label each time before using a product.

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INSECTS

Scouting Report

Honeylocust plant bug populations are exploding in northern Illinois. Acephate (Orthene) and other products for control are listed in the *1995 Illinois Urban Pest Management Handbook*. Treatments should be aimed at young nymphs before serious damage has occurred. The honeylocust plant bug has one generation per year. Trees that refoliate will not be attacked later in the season.

Euonymus scale crawlers should be out in northern Illinois and should still be active in central Illinois.

Lecanium scale crawlers emerge over a fairly long period of time and now may be emerging in southern Illinois. The reddish crawlers emerge from underneath the roundish, 1/4-inch-diameter adults. The crawlers are most common on maple, oak, hackberry, and walnut. Their numbers may be particularly high on stressed trees.

Bronze birch borer and birch leafminer treatments should be initiated in northern Illinois. Peak emergence of bronze birch borer coincides with *Spiraea vanhouttei*'s finishing bloom. Management suggestions for these two pests were presented in last week's newsletter and are available in the *1995 Illinois Urban Pest Management Handbook*.

Keep a watchful eye for cankerworm infestations in northern Illinois, particularly on oak tree; but honey locust, elm, and maple are also commonly attacked.

Mimosa webworm first-generation larvae should be out in southern and central Illinois. With the mild winter, this insect may be very numerous in Illinois this year.

We are still receiving reports of mystery bugs that are defoliating small deciduous trees and bushes. The damage is noticeable, but the insects are nowhere to be found. No, it's not a conspiracy; it may in fact be adults of the true white grub. These beetles feed at night and can cause severe defoliation, leaving only petioles. They disappear during the day, leaving only the trail of their crime spree. This problem can be reduced by treating the plants with carbaryl (Sevin) liquid before nightfall. (*John Lloyd and Phil Nixon*)

Spittlebugs

Spittlebugs are active in both pines and deciduous trees. I discovered a spittlebug infestation in some Christmas trees on May 15; and Mike Morrissey, research assistant for the Urban Pest Management program in Edwardsville, brought in a spittlemass from a flowering dogwood on May 25. Although all nursery stock and landscape plants should be monitored for spittlebugs, it is especially important for nursery operators and Christmas tree growers to scout for pine spittlebug.

The pine spittlebug attacks Scotch, Austrian, and white pines, as well as all spruces and firs. It completes one generation per year. The adult pine spittlebug is somewhat oval in shape, with its head more blunt and rounded and its abdomen tapering. It measures about 3/8 inches and is tan to dark reddish brown in color. Eggs are laid in July or August and hatch the following spring. Upon hatching, the nymphs begin feeding on shoots and produce a frothy spittlemass that they "hide" in. Sooty mold grows on spittle that is splashed onto other shoots. Nymphs feed for about 7 weeks before becoming adults. The adults continue to feed on their host but do not produce the spittlemass as they did as immature nymphs.

Spittlebugs rarely warrant control in deciduous ornamentals, but pine spittlebug can cause problems for nurseries and Christmas tree growers if infestations are high and the trees are under stress. The feeding wounds caused by this insect also serve as an entrance point for *Diplodia* shoot blight. Pine spittlebug nymphs can be controlled with a forceful spray of acephate, carbaryl, or dimethoate. (Tom Royer, *Integrated Pest Management educator, Edwardsville Extension Center, 618/692-9434*).

A Good Year to Be a Slug

With the persistent wet, overcast conditions during a peak period of slug reproduction and development, 1995 has seen greatly increased problems with slugs. A brief review on the management of slugs and slug control is therefore in order.

Slugs are gastropods, more closely related to mollusks, such as clams, than they are to arthropods (such as insects, mites, spiders, and scorpions). Slugs and slug eggs have been generally distributed and established in the region through the movement of infested plant materials and soil.

There is no one "magic bullet" to control slugs; a truly integrated approach to control is required. Effective slug control may consist of a blend of the following:

Prevention. Slug problems can be greatly reduced by manipulating the environment where they live. Slugs require high humidity to survive. Manipulating the environment to reduce moisture is one cultural method of management. Spacing out plants provides better air circulation, which in turn reduces the moisture in the area and reduces the slug's habitat. Reducing the amount of organic mulch also reduces the humidity and reduces slug problems. The benefits of the mulch must be balanced with the slug problem.

One other form of prevention is to remove damaged or overripe fruit that may be attractive to slugs. For strawberries, which naturally provide an ideal habitat for slugs, removing damaged and overripe fruit is very important.

Use of molluscicides. Slugs are not susceptible to any of the generally available insecticides, so specific molluscicides are used instead. Presently, metaldehyde is the only molluscicide labeled for general garden use. It is sold under a variety of trade names, in either bait or paste formulations (for example, Bug-Geta, Deadline, and Corry's Slug and Snail Death). Another bait, called Mesurool, is available for ornamental plantings but is not labeled for garden use.

When metaldehyde is either ingested or contacted, it acts by causing intense irritation of the slug. The slug responds to the metaldehyde irritation by producing a large amount of slimy mucous. Ultimately, the slug dies from loss of moisture.

To use metaldehyde effectively, pay attention to certain environmental conditions during application. Metaldehyde breaks down rapidly in sunlight, so applications are best made late in the day, with the metaldehyde placed under foliage. Also, slugs are able to rehydrate and recover from metaldehyde poisoning if moisture is available. Therefore avoid watering immediately before and after putting out the metaldehyde.

Metaldehyde is toxic to dogs if ingested in large quantities. However, baits are placed in the garden in quite small amounts, which would not provide a toxic dose. Furthermore, the baits are spread thinly and are not in any way attractive to pets, so ingestion is very unlikely.

Alternative slug killers. Most people have heard about the effects of salt placed on a slug—they are dramatic. Wood ashes have a similar effect. However, wood ashes and salt have no place in a garden, as they increase soil salts, which can hinder plant growth.

An alternative is household ammonia diluted to 5 percent (1 part in 20). This is a very effective contact slug killer. However, it can be used only when the slugs are out on the plants. Normally, this occurs at night. However, during some evenings, following a late day shower and continued overcast weather, the slugs are out before dark and thus can be targeted at this time.

Barriers. The only highly effective barrier to slugs is a strip of copper. This apparently acts by creating an electrical charge when the mucous reacts with the metal, giving the slug a "hot belly."

A variety of other barriers have been suggested. Wood ashes (with their salt content) make a good barrier; but, again, there is a problem with increasing soil salts. Diatomaceous earth makes a moderately effective barrier—until it gets wet.

Traps. Traps for slugs are designed either to provide for their physical needs for daytime cover or involve baits to lure them. A physical trap might be a moistened, rolled-up newspaper or fruit rind, under which the slugs will hide. During the day they can be collected and crushed or otherwise disposed of. (John Lloyd; adapted from an article written by Whitney Cranshaw, Colorado State University)

Apple Scab Update

Most of the experienced growers can identify apple scab, at least the typical scab that we see on crabapples in most years. We discussed the basics in issue no 3. This year, however, has been quite different in terms of scab infection and intensity.

Apple scab has created a good percent of the concern by telephone callers, as well as samples sent to the Plant Clinic. The Chicago area has been particularly blasted. The symptoms this year include browning of entire leaves, which eventually become covered with the more typical brown to green, fuzzy sporulation of the fungus. Sometimes leaves fall before the sporulation is easily visible. The cases that we have worked with at the clinic are apple scab. No other pathogens have been involved. We know of a few cases from the Chicago area that were sent to specialists in Ohio for diagnosis. They found only apple scab to be involved.

Some crabs have been so heavily defoliated that the owners believe fire blight is involved. Look for shepherd's-crook symptoms at the ends of branches and the appearance that stems have been killed with a blow torch. Fire blight kills foliage and stems, without intermittent green growth. If you are seeing green tissue interspersed with the brown, fire blight is not involved.

We also had some reports of edges of leaves browning before defoliation. It is possible that the scab fungus infected the petiole and caused this symptomology. It is also possible that the excess water in our state has caused root injury and subsequent scorch and leaf drop.

A few facts to keep in mind when dealing with your crabapple problems follow. Information still suggests that scab does not kill a tree. Chemicals can be used to control the disease, but they must be initiated at bud break and must be repeated as stated on the fungicide labels. Sprays now are not thought to have any benefit. Fruit pathologist Steve Ries suggests that heavily infected trees be fertilized now with a general tree fertilizer (no later than June 15) and that they be pruned next year to allow better air movement through the tree. He also points out that some excellent scab-resistant trees are on the market now; they should be considered for long-term control of scab. (Nancy Pataky)

Black Root Rot of Strawberry

We have had reports of black root rot occurring again this year on strawberry. The black root rot complex is caused by a number of fungal pathogens that invade when plants are grown in tight clay or poorly drained soils. These sites become particularly easy to detect when we have a rainy year. The disease also can be initiated by other environmental stresses, such as freezing.

Plants with black root rot exhibit a lack of vigor and productivity. When roots are examined, they show many black, rotted roots with few white feeder roots. A long list of fungi have been implicated in this disease complex, but treating the fungi does not control the problem. As long as the site stress is present the grower can expect to see the problem continue. (Nancy Pataky)

Botrytis of Strawberry

Here is another disease to watch for in prolonged rainy and cloudy periods. One of several blossoms in a cluster may turn brown and die. Light gray masses of dusty *Botrytis* spores soon appear. Infections are most common in well-protected areas because air movement is light and humidity is high. Berries that touch the soil, a decayed berry, or a dead leaf may become soft and light brown, with rapidly enlarging lesions. The berries soon dry out and become a dark brown "mummy" covered with the typical gray, dusty powder. As berries ripen, they become more susceptible to infection by *Botrytis*.

Fungicides are used to protect the blossoms and ripening fruit. Sprays are initiated during early bloom and are repeated at 7- to 10-day intervals through the fruit-ripening period. Multipurpose fruit spray plus Captan or Benlate is recommended for home growers. Consult the *1995 Illinois Urban Pest Management Handbook*, chapter 10, for further information on home fruit pest control. Commercial growers can use Ronilan or Rovral, depending on time of application. They should consult University of Illinois publication #MD-1, *Illinois Commercial Small Fruit and Grape Spray Guide* (1994).

Control measures for Botrytis (also called gray mold) also help control some of the other fungal diseases that infect strawberry. Avoid heavy applications of nitrogen fertilizer in the spring. Mulch plants and row middles with clean straw, hay, or other dry organic matter, or apply black polyethylene sheeting

to keep berries from contacting the soil. Pick fruit frequently and carefully, early in the day but after the plants are dry, to avoid spreading the fungus. For the same reason, cull all diseased berries.

For more information about Botrytis on strawberry, consult *Report on Plant Diseases*, no. 704. (Nancy Pataky)

Bacterial Leaf Spot and Stem Canker of English Ivy

With the vast beds of English ivy ground cover in Illinois and the extended rainy period this spring (seems forever now), bacterial leaf spot and stem canker has been and will be commonplace. It is first seen as small, circular, dark green, oily lesions on the leaves. Eventually, the spots enlarge and develop greenish brown, water-soaked margins and reddish brown to black centers. Yellow halos are common.

Bacteria invade the plant through natural openings in the plant or through wounds. This bacterial disease also invades stems and petioles, causing black cankers, cracked stems, and withered leaves. In warm, wet weather, conditions are ideal for disease development and spread. The plants can be severely affected, resulting in dwarfed and unthrifty, yellowed foliage, blackened twig tips, and decaying of the older wood. Look for this phase soon.

Although successful control of this disease is very difficult, concentrate on cultural improvements. Do not work with plants when they are wet, as this spreads the bacterium to healthy areas. Try to improve air circulation by thinning dense areas. Remove and burn or haul away diseased plant parts as soon as they are noticed. They serve as sources of disease spread.

If this disease has been severe in the past, you might consider using a fixed-copper compound,

starting when the new leaf growth begins and every 7 to 10 days in rainy spring and early summer weather. Copper fungicides are the only fungicides that aid in the control of bacterial leaf spot and stem canker, but they do not provide 100 percent control. They are available under a great variety of trade names at most garden centers. Ask for one containing 50 to 65 percent copper, and be sure to read the label for crop registration and details on rates and timing.

The fungal leaf diseases of ivy are similar to the bacterial disease and frequently follow a bacterial infection. Control measures are identical, except that other fungicides are also registered for the ivy fungal leaf spots. These include Domain and Chipco 26019. There may be others, but be certain to read the label carefully and to follow directions exactly.

For more information, consult picture sheet "Woody Ornamental Diseases I," as well as *Report on Plant Diseases*, no. 652. (Nancy Pataky)

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Mimosa webworm first-generation larvae should be out in central and southern Illinois on honeylocust and mimosa. Because the winter was mild, we may find higher-than-normal populations this year throughout the state. Mimosa webworms overwinter as pupae from the second generation and generally do not survive northern winters. Early infestations can be pruned to reduce defoliation.

Bagworms may be hatching from eggs in southern Illinois. Young larvae are hard to see until they build bags of plant material around themselves. Treatments for bagworms should be applied a couple of weeks after initial egg hatch. If you delay treatment, late-hatching larvae can be caught.

Lecanium scale crawlers should be visible in southern and central Illinois. The crawler stage of the scale is most susceptible to control measures. Crawlers of this scale are reddish and active. Crawlers emerge over a prolonged period of time on maple, oak, hackberry, and walnut.

Tom Royer, IPM educator, and Mike Morrissey, research assistant in urban IPM, have observed that elm leaf beetle larvae are getting ready to pupate in the Edwardsville area. Larval control with *Bacillus thuringiensis san diego* (M-One or Trident) should be saved for second-generation larvae later this summer.

Management recommendations for all the pests just mentioned are available in the 1995 *Illinois Urban*

Pest Management Handbook. Please let us know if you notice any insect activity in your area. The more eyes we have in the field, the more precise our newsletter can be for you. (John Lloyd)

Potato Leafhopper

Damage from potato leafhoppers is becoming apparent on red maples throughout central Illinois. Potato leafhoppers, as the name indicates, feed on potatoes and other crop commodities; but they are also pests of ornamental plants. Red maple, sugar maple, redbud, euonymus, and black locust are ornamental hosts for the leafhoppers. Feeding by the leafhoppers initiates damage that imitates 2,4-D herbicide injury. New red maple leaves become cupped, distorted, and stunted. The margins of the leaves also turn brown or black. Early fall coloration, reddish areas on the leaves, is another symptom of potato leafhopper injury on most of its ornamental hosts. Yellow coloration on the leaves is a symptom on sugar maple and redbud. On newly planted trees and nursery stock, potato leafhopper feeding not only damages the leaves but reduces stem growth.

Potato leafhoppers overwinter in the southern United States and fly north in the spring to feed on potatoes and alfalfa. Potato leafhopper populations were identified in the Collinsville area on May 11 in alfalfa and since have moved north and onto their ornamental hosts. Adult potato leafhoppers are approximately 1/8 inch long and bright green. Nymphs (immature leafhoppers) are the same color, but smaller in size, and lack wings. It is difficult to see the leafhoppers, because the nymphs crawl rapidly and adults fly away when they are disturbed. The best indication of a potato leafhopper problem is the symptoms the plant materials exhibit.

Potato leafhopper control for homeowners consists of using carbaryl (Sevin) or acephate (Orthene). Nurseries and other landscape professionals can use pyrethroids listed in the 1995 *Illinois Urban Pest Management Handbook*. (John Lloyd)

Carpenter Bees

Carpenter bees are active in the Collinsville area. This bumble bee lookalike can be distinguished from its more well-known relative because it doesn't have the yellow hair on its abdomen, giving it a black shiny appearance.

Carpenter bee females bore tunnels into wood and prefer weathered or unfinished lumber. They tend to frequent barns, wooden buildings, telephone poles, and outdoor decks. The entrance hole measures about 1/2 inch in diameter and looks as if it could have been made with an electric drill. The hole is carved out against the wood grain, then it then makes a right-angle turn and follows the grain for up to 3 feet. The female bee divides the gallery into sections and packs each section with flower pollen. She then deposits an egg and seals the section with chewed wood pulp. The larvae hatch and feed on the pollen, pupate, and emerge as adults in mid- to late summer. Adult bees overwinter in old galleries and thrive during mild winters like the one we just experienced in southern Illinois.

An active carpenter bee infestation can be controlled by placing a small amount of carbaryl (Sevin) dust into the tunnel entrance. Don't plug the hole right away. Carbaryl works as a stomach poison, and the bees must be allowed to enter and exit the hole. They collect the poison on their bodies and ingest it as they groom. Consider treating the entrance again in about 2 to 3 weeks to control newly emerging adults. Although female bees rarely sting, they possess a stinger, so take precautions when treating an active infestation. Future infestations can be discouraged by applying a coat of varnish or paint to wood that has already been attacked and by plugging up old gallery entrances in late summer or early fall. (*Tom Royer, IPM educator, Edwardsville Extension Center, 618/692-9434*)

Pine Shoot Beetle in the Midwest

The pine shoot beetle (*Tomicus piniperda*) continues to attract attention throughout the Great Lakes region as several states and additional counties report new detections of this recent invader. In fact, since late April, Champaign, Vermilion, Grundy, and Winnebago have been added to the list of Illinois counties quarantined due to detected populations of pine shoot beetle. This steady increase in reported infestations might at first suggest an alarmingly rapid spread of pine shoot beetles since their initial detection in Ohio in 1992. However, ongoing studies and closer exami-

nation of the patterns of infestation are answering many questions concerning the history and consequences of this newly established pest.

Most evidence now suggests that these beetles actually have been present in North America since the 1980s but were simply undetected until 1992. Once experts identified these shoot-feeding bark beetles as nonnative (their normal range is Europe, Asia, and North Africa) and determined their damage potential, an extensive survey program was undertaken to track their spread throughout the North Central region. Improvements in trapping technology have led to more intensified survey efforts over the last 2 years, probably contributing more to the increase in detection of infested counties than has the actual spread of the beetle. For example, 65 traps baited with alpha-pinene, a highly attractive component of pine resin, have been placed in Christmas tree plantations, forest preserves, and National Forest land in 19 Illinois counties participating in the 1995 trapping program. Also, preliminary results of DNA studies conducted by the Forest Service on various beetle populations suggest that at least two different introductions have occurred, one in Ohio and the other in Illinois. These separate populations appear to be mixing in northwestern Indiana as the Ohio introduction has gradually spread both east and west. The exact origin of these populations is still unknown, but based on PPQ (Plant Protection and Quarantine) interception records, the likely source is probably European cargo ships carrying infested crating and cargo-bracing timbers.

Current understanding of the biology, distribution, and host range of North American populations of pine shoot beetle suggests that they will not only survive in their new homes but will be successful and continue to spread into new areas. Exactly how serious a pest the pine shoot beetle might eventually become is still uncertain, but several aspects of their behavior and biology are relevant and of some concern. The pine shoot beetle is apparently able to reproduce and shoot-feed on all species of pines native to the Great Lakes region. Further, the pine shoot beetle typically flies and colonizes recently cut stumps and logs several weeks earlier in spring than any of our native bark beetle pests, thereby outdoing its competition and avoiding many potential predators. Due to these factors and the beetles' ability to damage and kill shoots, USDA officials continue to impose quarantine regulations on all infested counties to help curb the artificial spread of this pest until its exact threat is

fully understood. In spite of legislation, new states and counties likely will report infestations as the pine shoot beetle continues to increase its range by seasonal adult flights. Unfortunately, although pine shoot beetle is one of our most recent exotic forest insects, it appears to be here to stay. As we learn more, we suspect we'll learn to live with it. (*Charles Helm, survey entomologist, Illinois Natural History Survey*)

PLANT DISEASES

Brown Patch of Turf

Brown Patch is a fungal disease caused by *Rhizoctonia*. It commonly occurs in hot, muggy weather when night temperatures are at least 70°F and daytime temperatures are in the 80s and 90s. It is favored by heavy rains or watering and by grass that is dense and at least adequately fertilized. The disease appears as patches, up to 2 or 3 feet across, where turf is light brown (see the picture sheet "Turfgrass Diseases," no. 5). The disease shows up best during wet weather, but the turf is not matted, as occurs with some of the other wet weather diseases. A few cases of brown patch have been confirmed at the Plant Clinic.

Brown patch can be prevented by using cultural practices listed in *Report on Plant Diseases (RPD)*, no. 411. If the disease occurs, chemicals may keep it from spreading, but long-term control requires following cultural recommendations. Chemical options are listed on page 13 of the *1995 Illinois Urban Pest Management Handbook*. Be sure to read the label on the selected product for recommended formulations, rates, and timing for your particular turf conditions. Because such applications usually require sprays at 5- to 14-day intervals throughout the summer, fungicide control of brown patch is usually reserved for golf courses. Products are not always available in quantities suitable for the homeowner's use. (*Nancy Pataky*)

Wet Feet: Yews, Roses, Rhododendrons, Etc.

The overabundance of rain in the last months has again caused root problems for many plants. This condition is often called "wet feet." Symptoms are often the same as those resulting from a lack of water and include withering of leaves, little terminal growth, and dieback of shoots and roots. Actually, even though there is an abundance of water, it cannot be absorbed by the plant. Excess water causes a lack of soil oxygen. Without oxygen, roots cannot respire

properly and cannot take up water. Roots actually suffocate. For long-term control, you must improve drainage, lighten the soil with a mixture of organic matter and sand, and avoid too much additional watering.

If you are not certain that wet feet (too much water around roots) is the problem, dig up the soil around the suspect plant. The soil is saturated, and you may even find standing water. Roots are black or brown internally, instead of the white color of healthy, new roots. In most cases, fungicides do not help. These are developed to protect healthy plants from root-rot pathogens. They do not revive dead roots. The water problem must be alleviated for new roots to form.

Jim Schuster, Extension educator in horticulture, suggests the following practice to determine the drainage situation on a new site. Dig a test hole the same depth as that needed for the root ball to be planted. Fill the hole with water. If it does not drain within 6 hours, then the site does not have adequate drainage for your tree or shrub. This test should be done on a site that has some soil moisture. The test is not valid on a bone dry site. Jim also adds that trees and shrubs vary in their susceptibility to poor drainage, and some species may be able to withstand more water. Still, Jim warns that if the hole takes 12 hours to drain, then you should consider fish.

In some cases, wet soils predispose plants to root rots. For instance, *Pythium* and *Phytophthora* are common water-mold fungi that invade stressed plants in wet soils. If plants have a root rot and the water problem has been alleviated, then a root-rot fungus might be involved as well. This is particularly true if not all plants in a bed are affected. (*Nancy Pataky*)

Algae in Turf

Another problem on turf we have seen at the Plant Clinic is algae. These are actually a group of filamentous green plants; but, under very wet surface conditions, they appear as a thick, slimy, greenish-to-brownish scum on thin turf or bare ground. Algae is noticeable in low, heavily tracked areas of heavy shade.

There are chemical controls for severe cases of algae, but it is best to improve the site for long-term control. Improve soil drainage; improve air movement in the area through pruning where possible; aerify the compacted areas; and provide alternate traffic patterns with walks or paths. Copper sulfate, Daconil 2787, or mancozeb may be applied when the algae is first seen and reapplied as needed. (*Nancy Pataky*)

Rhododendron and Azalea: Phytophthora Root Rot

Several species of the soilborne fungus *Phytophthora* cause this disease. Symptoms include a dull yellowing and dwarfing of leaves and stunted shoot growth. Infected leaves usually roll downward and inward and eventually wilt. Shoot tips, even entire young and mature stems, may wilt and die back. Infected roots are reddish brown and brittle.

The causal fungus is known as a water mold. To infect, it requires wet soil conditions. If rhododendrons are not growing well, the problem often can be traced to this root rot or a poor planting site for this species. Some good information on soil and site preparation for rhododendrons can be found in Special Publication 74, *Large Flowering Shrubs for the Midwest* by Morrissey and Giles.

It is also important to purchase only disease-free plants from nurseries where strict sanitation and indexing procedures for propagation have been followed. The plants should have an abundance of white, healthy roots and good foliar color and be free of leaf lesions. Plant in sites protected from wind and indirect afternoon sun, and avoid southern exposures.

Chemical control options include Truban, Terrazole, Banrot (40 percent WP), Subdue, Aliette (80 percent WP or WDG), and Banol. These are listed in the *1995 Illinois Urban Pest Management Handbook*. For more information on Phytophthora diseases of rhododendron and azalea, consult RPD, no. 664. (Nancy Pataky)

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HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
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NEWSLETTER

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INSECTS

Scouting Report: June 12-18

Northern and central Illinois: Honeylocust plant bug and ash plant bug are still active and causing damage in northern Illinois. Honeylocust plant bug damage is severe in spots. We are starting to notice adult honeylocust plant bugs in central Illinois, which means that the majority of this season's damage has already occurred in this area. Cottony maple scale should be noticeable on silver maple and other hosts in northern and central Illinois. Besides the sticky honeydew they secrete, their white popcornlike egg masses should become apparent soon. The cottony egg masses help distinguish them from lecanium scale. As of this writing, northern catalpa trees are in full bloom in most northern counties in Illinois, which means that euonymus scale crawlers should be out and susceptible to control measures in this area. Potato leafhopper damage is apparent on red maples and other hosts throughout central Illinois. Identification and recommendations are in last week's newsletter.

Southern Illinois: Mike Morrissey, research assistant at Edwardsville, reported black locust weevil and locust leafminer feeding on black locust at the SIU-E campus. Bronze birch borer adults were observed ovipositing on older birch trees. Pheromone traps indicate that dogwood borer flights have been heavy for 2 weeks. Several home gardeners have reported moderate leaf-feeding injury from grape flea beetle larvae this year. Southern masked chafer flights have not been apparent, but should begin soon.

Management recommendations for all of the pests just mentioned are available in the *1995 Illinois Urban Pest Management Handbook*. (John Lloyd and Tom Royer)

Plant Bugs in Northern Illinois

Two common species of plant bugs, ash plant bug and honeylocust plant bug, are causing noticeable damage on ash and honey locust in northern and central Illinois.

The adult ash plant bug is about 1/8 inch in length and pale green to pale brown, with a heart-shaped marking on the upper surface of the thorax. The bugs are elongate and soft-bodied, with a four-segmented antennae and long, beaklike mouthparts. Plant bugs are quite active and capable of flying when disturbed.

Overwintering eggs of the ash plant bug hatch in the spring. Young red nymphs move to the newly emerged foliage and begin feeding on the underside of the leaves. Feeding and damage occur all season long on white and green ash. There are two generations of ash plant bug per year. Adults of the second generation of ash plant bug live until the first frost. Feeding damage by the ash plant bug does not kill the tree but may reduce vigor and overall plant health. Damage appears on foliage as small white flecks or irregular white spots. Heavy infestations of ash plant bug, where the bugs are concentrated on the leaf petiole, may cause wilting, curling, or drying of the leaf blade.

The honeylocust plant bug is similar in size (1/8 inch long) to the ash plant bug and a pale green in both the nymphal and adult stages. This insect also overwinters as an egg. Young honeylocust plant bug nymphs begin to feed as soon as honeylocust trees leaf out. Feeding damage on new leaves can result in severe distortion, dwarfing, chlorosis, and browning of the leaflets. Heavy plant bug populations may cause premature defoliation. Lightly to moderately damaged foliage remains on the tree throughout the year. Yellow-leaved strains of honey locust (for



example, “Sunburst”) appear to be more susceptible than the green-leaved strains (for example, “Shade-master”). One generation of honeylocust plant bug occurs each year. In northern Illinois, they disappear by late July. Trees that re-foliate are not attacked by the honeylocust plant bug later in the season.

Control of both plant bugs can be achieved by applying a foliar spray of acephate (Orthene), cyfluthrin (Tempo), or bifenthrin (Talstar). Other controls are listed in the *1995 Illinois Urban Pest Management Handbook*. (Fredric Miller, *Integrated Pest Management educator, Countryside Extension Center, 708/352-0109*)

Euonymus Scale

The euonymus scale is quite common on euonymus shrubs. Heavy infestations of this scale may kill portions of the host plant. The insect overwinters as a partially grown female. Eggs hatch into the crawler stage of the scale in late May and early June. The young crawlers are yellow or orange and oval in shape. The crawlers move about on the twigs, branches, and foliage of the plant just about the time that northern catalpa, *Catalpa speciosa*, and the Japanese tree lilac, *Syringa reticulata*, are blooming.

When the crawlers settle down, they form a hard covering and continue feeding on the plant. Male scales are white and rectangular in shape, while female scales are more oval and grayish brown. Plants with heavy infestations may appear to be white-washed.

Treatments to control the scales should be aimed at the crawlers. Euonymus scale can be controlled by applying a crawler spray of acephate (Orthene), dimethoate (Cygon), malathion, or diazinon according to label directions. (Fredric Miller, *Integrated Pest Management educator, Countryside Extension Center, 708/352-0109*)

Locust Leafminer

Locust leafminer is one of the more serious pests of black locust. The adult beetle measures 3/8 inch and is orange, with a black head and legs and a black stripe running down the center of the elytra. Its elytra are pitted, giving them a “netlike” appearance. Locust leafminer overwinters as an adult and becomes active in the spring. Full-grown larvae are flattened and yellowish white in color, with a black head.

Adult females deposit eggs on the underside of the locust leaf. Once hatched, the larvae begin feeding on the inner layer of leaf tissue, forming a blotch-shaped

mine. They seem to prefer feeding on the terminal part of the leaves. They pupate in the mine and emerge as adults, which skeletonize the leaves. A second brood probably occurs in southern Illinois. Damage to leaves is quite evident. Leaves turn a bronze-brown color, which may lead one to conclude that they are drying from a lack of water.

The combined feeding of the adults and larvae can kill black locust trees under the right conditions. A large first brood may defoliate the tree, causing it to produce a new set of leaves. As new leaves grow, the second brood can then destroy the second set. If this occurs over several years, the tree dies. Fortunately, this rarely occurs because there are several wasp parasites and other natural enemies that help reduce populations. Acephate (Orthene) provides systemic control of young leafminer larvae. It is ineffective against older larvae and pupae. (Tom Royer, *Integrated Pest Management Educator, Edwardsville Extension Center, 618/692-9434*)

Leaf Galls

We have received many calls this spring from concerned homeowners who have severe leaf gall problems on their trees. Galls can be created by insects, mites, bacteria, fungi, and nematodes. A brief review on arthropod- (that is, insect- and mite-) induced galls of trees and shrubs should help answer some of the basic concerns that many people have about galls.

Galls are actually created by the plants themselves. They are the plant's natural response to feeding by certain species of insects and mites. When the insects feed, they create mechanical damage or salivary secretions that initiate the production of normal plant-growth hormones within the plants. These hormones produce abnormal cell growth that results in the development of galls. For gall formation to occur, the stimulus (feeding) must be initiated when the leaves or other plant parts are growing rapidly.

Galls are initiated by mites and immature stages of wasps, midges, aphids, psyllids, and other insects. As the galls develop, they form protective barriers around the insects and mites. The insects and mites feed inside the galls. The galls protect the gall makers from environmental conditions, many pesticides, and some natural enemies. Even with this ready-made protection provided by the host plant, some parasitic wasps and other natural enemies circumvent the gall defense and provide some control of gall makers.

Gall-inducing insects and mites have species-distinct galls. Identification of the gall maker is based

on the gall it produces. Over 2,000 types of galls are produced just by insects. The majority of the galls are produced by wasps. Over 700 wasp-produced galls occur on oak trees.

Of the galls found on trees, leaf galls on the petiole and upper or lower leaf surface are the most common. These galls appear as leaf curls, blisters, nipples, or hairy growths. Whereas these leaf galls may be unsightly, the majority of leaf galls do little or no damage to the host plant. Leaf galls that we have encountered in high numbers this year include roly-poly gall on oak, succulent oak gall, maple bladder gall, and hackberry nipple gall. The majority of these galls are not harmful to the trees. Trees produce enough unaffected foliage to maintain their vigor.

Chemical control of these leaf galls is difficult to impossible. Control to prevent galls must be initiated before gall formation begins. Treatment after gall formation is initiated may kill the gall maker, but the gall continues to grow. The gall maker may initiate the gall, but the gall is produced by the plant and continues to grow. Treatments to control leaf galls may cause a worse problem by killing natural enemies that regulate the gall-maker populations and increase gall problems in the future. For most leaf galls, management is unnecessary and impractical. Specific leaf gall problems that should be managed on trees and shrubs are listed in the *1995 Illinois Urban Pest Management Handbook*. (John Lloyd)

PLANT DISEASES

Dutch Elm Disease

This spring, the Plant Clinic has received several elm samples with Dutch elm disease (DED). DED is a vascular wilt disease caused by the fungus *Ceratomyces ulmi*. It affects only trees in the elm family (Ulmaceae). American elms are very susceptible. Although Chinese elm and Siberian elm are more resistant, infection of these species can occur. More resistant elms have been developed, including Sapporo Autumn Gold, American Liberty, and Urban elms.

Initial symptoms of DED are yellowing of the leaves, followed by wilting and browning. Usually a single branch is affected, then symptoms spread to adjacent branches, and finally the entire tree wilts and dies. Development of symptoms may occur within one season in susceptible trees or over several years for more resistant trees. If you peel back the bark of infected branches, you reveal brown streaks in the

outer sapwood. Other wilt diseases of elms (such as Verticillium wilt and Dothiorella wilt) also cause this discoloration, so positive identification requires laboratory culturing of the fungus. Cut several 6- to 8-inch long sections from wilting, but living, branches that show definite streaking in the sapwood. The fresh wood sections should be 1/2 to 1 inch in diameter. Send them in a plastic bag to the Plant Clinic.

The DED fungus is spread from diseased to healthy trees by elm bark beetles and root grafts between adjacent trees. Once a tree is infected, there is no cure for DED. Some people would argue, however, that it can be controlled if caught before the tree is more than 5 percent infected. Controlling DED involves sanitary measures (pruning and burning or burying any injured, weak, or dead elm wood), spraying to control the insect vectors (to reduce the disease's rate of spread), and injecting particularly valuable trees with systemic fungicides. Note: Repeated trunk injections may damage the tree seriously, rendering it more susceptible to other infections.

Further information on DED, including control procedures, is available in *Report on Plant Diseases (RPD)*, no. 647, and on page 66 of the *1995 Illinois Urban Pest Management Handbook*. (Lindsey du Toit)

Elm Yellows or Phloem Necrosis of Elm

Frequently, the clinic receives telephone calls concerning elm trees that are showing decline similar to the Dutch elm disease decline, but without the vascular discoloration. The question arises as to what other infection could cause these symptoms. One of the most likely diseases is elm yellows, also known as phloem necrosis. It is also one of the most difficult to confirm. Symptoms should begin to show in the next several weeks.

Elm yellows or phloem necrosis is primarily a problem of American elm. Other susceptible elms include winged elm, cedar elm, red or slippery elm, September elm, and hybrids of red and Siberian elm.

The disease occurs throughout Illinois but is more common in the southern two-thirds of the state. The first noticeable foliar symptoms are usually seen in midsummer and include a rapid, general decline. Leaves droop, curl upward at the margins, turn yellowish green then bright yellow, and finally turn brown and drop off within a few weeks. Branches then die, followed by the entire tree within one growing season.

Elms that exhibit leaf symptoms after early August usually leaf out normally the next season. These

leaves wilt, turn yellow, and drop in late June or July. Usually American elms show symptoms throughout the entire crown at the same time. The innermost bark of infected trees turns yellow then butterscotch or tan, sometimes flecked with dark brown before finally turning totally dark brown. When several pieces of the inner bark are chiseled from dying trees and placed in a small, clear jar for 5 minutes, they have a faint odor of oil of wintergreen.

The disease is caused by an organism known as a mycoplasma-like organism, or MLO. It is similar to a bacterium that lacks a cell wall. Unfortunately, MLOs cannot be cultured in a lab. They cannot be positively identified at the Plant Clinic. Most are identified in the field based on the symptoms just described. For information on this disease, refer to *RPD*, no. 660.

Infected trees cannot be saved. All dead and diseased trees should be promptly removed, then burned or buried. There are elms resistant to the MLO bacterium that causes elm yellows. These include smoothleaf elm (*Ulmus carpinifolia*), Scotch elm (*U. glabra*), Chinese elm (*U. parvifolia*), and Siberian elm (*U. pumila*). (Nancy Pataky)

Oak Leaf Blister

This disease was mentioned in an earlier issue of the newsletter (no. 6) when we discussed peach leaf curl. Both diseases are caused by the *Taphrina* fungus, and both occur in years with cool, wet weather in the spring. This year, we have had many samples at the Plant Clinic that showed this blister on oaks. Heavy infections may cause oaks to be unsightly but do not endanger the life of the trees.

Young, partially grown leaves develop circular, raised, wrinkled, yellowish white spots on their upper surfaces, with yellowish brown to gray depressions of the same size on the corresponding lower surfaces. The "blisters" later turn reddish brown and finally dull brown with age. Severe disease may cause some premature defoliation.

No controls are usually suggested for this disease. Collecting and composting or burning the leaves as they drop may help in reducing the inoculum for next spring. For more information, consult *RPD*, no. 663, "Oak Leaf Blister." (Nancy Pataky)

Cytospora Canker of Spruce

Cytospora canker (also known as Leucostoma canker) is probably the most common and damaging infectious disease of spruce in Illinois. It certainly accounts

for many of the spruce samples received at the clinic. Colorado blue and Norway spruce are very susceptible, especially when they reach the age of 10 to 15 years, and especially when they are growing in stressed sites.

You probably first will see this disease because of the dead or dying branches; but symptoms include a browning of needle tufts at the branch tips, followed by death of the lower branches. Less frequently, the death of branches occurs at the center of, or near the top of, a tree. The needles may drop early from affected branches or hang on for several months, leaving dry, brittle twigs. Conspicuous patches of white resin commonly form on the bark in cankered areas. The diseased tissue is brown underneath the thin layer of outer bark. Black, pinhead-sized fungus fruiting bodies (pycnidia) form in the dead inner bark.

When confirming Cytospora canker, the diagnostician needs to examine some of the resin area and surrounding wood so that the diagnostic pycnidia can be found. Examining dead branch tips might lead to an erroneous or ambiguous diagnosis.

There are no chemical controls to prevent or eradicate this disease. Remove dead branches as they occur (but wait for dry weather to prune), and try to improve tree vigor. Apply a thick organic mulch under the full spread of the branches. A mulch helps to retain moisture and prevents deep freezing, as well as alternate freezing and thawing. Water trees thoroughly (moisten the soil up to 12" to 14" deep) during extended dry periods and fertilize every few years based on a soil test.

For more information about Cytospora canker of spruce, consult *RPD*, no. 604. (Nancy Pataky)

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HOME, YARD & GARDEN PEST

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illinois natural history survey, champaign

NEWSLETTER

No. 10 • June 28, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report: June 19–23

Northern Illinois: Insect activity is slowing down in northern counties in Illinois. Most of the leafminers are finished in their first generation, and plant bug activity has decreased. Aphid populations on spirea and crabapple seem to be on the increase. With the warm and dry conditions, warm-season mites may become more prominent. There are some reports of honeylocust spider mites in the Chicago area.

Central Illinois: Leslie Marsh, landscape scout for the urban IPM program in Champaign, reported seeing aphids on spirea and tulip tree, and mealybug on hawthorn. The spirea aphids were being fed upon by large numbers of lady beetle larvae. Large populations of tuliptree aphid can build up in late summer and fall. Severe infestations on tulip tree create large amounts of honeydew and may cause leaves in the outer canopy to turn brown and drop off.

European earwigs are prevalent throughout central Illinois. They are primarily a nuisance pest when they enter homes. They occasionally cause damage to flowers and may be found feeding and causing minor damage on leaves of vegetables or ripening fruit. They are beneficial in that they scavenge on decaying organic matter and feed on insect larvae and other small animals.

Potato leafhopper damage on red maple, euonymus, and red bud is still occurring throughout the

area. See issue no. 8 for more information on potato leafhopper.

Southern Illinois: Bronze birch borer adults are still active, and the dogwood borer flight remains heavy. Yellow poplar weevil is still active. Bagworms have begun to hatch on flowering crabs. Flowering crabs with galls containing rosy apple aphids were received this week. Trish Boyce, Extension educator, Randolph County, received a report from a homeowner with a very large infestation of millipedes. Moist conditions and high levels of organic matter are conducive to millipedes and earwigs. (*John Lloyd, Tom Royer, and Fred Miller*)

Cottony Maple Scale

We've received several calls and a few samples of cottony maple scale from central Illinois during the week of June 19 to 23. The egg sacks of the female scales are prominent.

The egg sack appears as a white cottony mass emerging from beneath the brownish scale cover of the female. The scale itself is about 1/4 inch, the egg sack about 1/2 inch in size.

Egg sacks appear as popcorn on the underside of small branches on the scale's primary host (silver maple), other maples, alder, apple, beech, black locust, boxelder, dogwood, elm, euonymus, honey locust, linden, mulberry, oak, osage orange, peach, pear, plum, poplar, rose, sumac, and sycamore. Infested trees are rarely killed, but heavy infestations may cause dieback of individual branches and a general decline in plant vigor.

Cottony maple scale overwinters as immature females (nymphs) on twigs and branches. Female scales mature when plant growth resumes in the spring. In late spring and early summer, the females produce conspicuous cottony egg masses that may contain over 500 eggs. Eggs hatch into the crawler stage of the scale in late June and early July in central and northern Illinois. The crawlers are extremely small and appear as yellow-orange moving dots.



Crawlers, as their name implies, crawl to the underside of leaves of the tree, where they settle down and feed on the sap. The male scales mature in late August and early September, when they mate with immature females, fulfilling their purpose in life, and die. In late September, just before leaf drop, fertilized female nymphs migrate from the leaves to twigs and branches, where they overwinter. Only one generation of cottony maple scale occurs each year.

One symptom of heavy infestations of cottony maple scale is honeydew. After the crawlers settle down and begin feeding on the sap in the leaves, they can create enormous amounts of honeydew. In heavy infestations, leaves may get stuck together, and the ground underneath the trees may become extremely sticky. Infestations of this magnitude can occur on silver maple but are less likely to occur on other hosts. Sooty mold is commonly found growing on the honeydew in midsummer to late summer.

Cottony maple scale serves as a food source for many predaceous insects and parasites. The twice-stabbed ladybeetle, which feeds on soft-bodied insects, is commonly found dining on cottony maple scale crawlers. Cottony maple scale outbreaks often subside in 2 to 3 years, due to control by natural enemies. Unfortunately, the predators and parasites are susceptible to many of the insecticides used in the landscape and are often eliminated before they can adequately control the scale.

In severe infestations, chemical control of cottony maple scale may be desirable. Dormant-oil treatments can be used to control overwintering female nymphs on most hosts (except sugar and Japanese maple) before budbreak. Other treatments should be aimed to control the crawlers on the foliage in July, when the crawlers first become active. Repeat treatments may be needed after 10 days. Foliar applications of acephate (Orthene), malathion, or summer horticultural oils to the underside of the leaves should provide control. Do not use acephate on red or sugar maple. (John Lloyd)

Bagworms

Bagworm eggs are hatching in southern Illinois. These caterpillars overwintered as eggs within the old female bags left on the plant. One bag may contain 500 to 1,000 eggs. Bagworms feed on many plants but are common on arborvitae, juniper, cedar, pines, spruces, and a number of deciduous trees.

As the caterpillar feeds, it constructs a bag (made of silk and plant material) that it remains inside as it feeds. This bag protects the worm from natural

enemies (and from pesticides, to an extent). The worm feeds for several weeks, then pupates. Male moths are winged and emerge in the fall to search for the wingless females, which remain in their bags.

Early management of bagworms is essential for effective control. Look for small bags to determine when to treat. When they reach this stage, the majority of the eggs have hatched and control will be effective. Old bags can be removed before the eggs hatch in low-lying shrubs. Young bagworms can be controlled effectively with *Bacillus thuringiensis* var. *kurstaki* (Dipel or Thuricide), acephate (Orthene), carbaryl (Sevin), or malathion. Consult the label for rates. (Tom Royer)

Mole Control

Recently, there has been some publicity regarding the use of castor oil and detergent as a repellent against moles. One product, Mole-Med, has been tested in field trials by Michigan State University (MSU) staff. They report mole repellency in 26 of 27 trials. However, it should be kept in mind that although field trials can provide us with helpful insights from time to time, formal efficacy tests (subject to peer review and acceptance in the scientific literature) are the most reliable means by which to evaluate new technology. This is especially true when we consider chemicals that will be added to our environment that may affect animal behavior. The formal scientific process also helps to prevent us from wasting money or time or from causing unintended damage to the environment.

Several questions and considerations are important regarding the use of castor oil and detergent in the turfgrass environment where people, companion animals, wildlife, and important soil organisms reside.

Regarding the turf environment. (1) Repellents are, in fact, one type of pesticide. What are the negative effects of castor oil/soap on the earthworms, insects, and other invertebrates and microbes present in the soil (2) Are there any adverse consequences on plant life? Horticulturists, turf specialists, and agronomists should be consulted. (3) The field studies of MSU also report that Mole-Med caused the local wildlife to stop interacting with the treated area. Is the treated turf safe for children, wildlife, and pets? Is the local, desirable songbird community affected? (4) Does the yard smell like castor oil?

Regarding mole repellency. (1) All the scientific literature to date regarding moles does not support the use of repellents against moles. (2) Mole-Med claims to repel moles and prevent damage. Does this include deep tunneling as well, and does it eliminate the

mounding from deep-tunnel construction? Does the mole evacuate the area, or simply stop using the upper portions of the soil temporarily? (3) The treatment is said to last only 30 to 70 days, and it may require reapplication after rain. Consider that moles may live 3 to 5 years. Is the homeowner to consider applying the oil once a month, March to October, and after every rain storm in the spring and summer? Is this practical? Considering the spring of 1995, how many reapplications might be required? (4) The MSU report states that it may take 3 to 7 days for repellence to occur. Thus, this is 3 to 7 days of damage while waiting for something to happen. One or 2 months later, must the property owner sustain another 3 to 7 days of damage before repellence takes effect? (5) If the time spent making applications of this liquid results at best in a repellence effect, then this same amount of time (or less) could be used to trap or live-capture the mole and eliminate the source of the problem. If, for example, pregnant females are only repelled, the population grows. Therefore, the trapping or removal of pregnant females is certainly the most cost-beneficial on a long-term basis. (6) One professional mole trapper, who has trapped thousands of moles over the past 8 to 10 years, claims to have been repeatedly hired by people who tried unsuccessfully to repel the moles with castor-oil treatments. (7) The new EPA registration for the Mole-Med product is currently good for only one year. Perhaps it would be prudent to be patient and see if the product survives a registration renewal.

Personally, after working with moles for the past 15 years, and after studying all the literature on mole behavior, damage, and control, I still believe traps and live-removal are the *most* cost-effective approaches to mole control. For homeowners who do not have the time or interest in this approach, many wildlife-control companies now offer mole-trapping services at reasonable costs. Consult the yellow pages. (*Bobby Corrigan, vertebrate pest specialist, Purdue University*)

PLANT DISEASES

Plant Clinic to Close July 3

The Plant Clinic will be closed on Monday, July 3. With the official holiday on July 4, this means you should avoid sending in samples June 30. They could sit in mail trucks for 4 days!

Bacterial Leaf Spot of Stone Fruits

We have begun to receive calls and samples of bacterial spot on stone fruits. The disease is caused by a species of the *Xanthomonas* bacterium and is favored by stormy, rainy weather in June and July. The wetter parts of the state may see this disease on peach, nectarine, almond, apricot, plum, prune, and cherry.

Numerous small spots (1/25 to 1/5 inch) form in the leaves. These are at first circular and water-soaked, but soon enlarge to become angular and deep purple to rusty brown or black. The centers of the spots often dry and tear away, so you may see this only as a shot-hole appearance or even a wind-tattered effect. Infected leaves turn yellow and drop early. Fruit pathology specialist Steve Ries states that symptoms resemble nitrogen deficiency. Lack of nitrogen, however, usually causes the holes to be concentrated near the midvein on the leaf.

The bacterial spot bacterium also attacks the twigs and fruit, reducing fruit quality and yield, as well as weakening the tree overall.

Some peach cultivars have resistance to this disease. Most apricot varieties are susceptible, as are many nectarine varieties. Some resistant cultivars of peach are listed in *Report on Plant Diseases (RPD)*, no. 810, "Bacterial Spot of Stone Fruits."

Other than use of a resistant cultivar, the best control measures of bacterial spot in a homeowner's situation are to use balanced fertility practices and open the trees through pruning so that air circulation is detrimental to disease development. The *1995 Illinois Urban Pest Management Handbook* lists the spray schedule for stone fruits in home gardens. However, keep in mind that once-a-week spraying of the entire tree is essential for disease control. (*Nancy Pataky*)

Physiological Leaf Roll of Tomato

Leaf roll of tomato has begun to appear in the wetter parts of Illinois. The lower leaves are affected first, with an upward cupping of the leaves. This progresses in intensity and in distribution on the plant, sometimes causing a severe leaf roll over the entire plant. The rolled leaves are leathery to the touch.

This condition may be confused with a viral disease or possibly chemical injury from a product such as 2,4-D or dicamba. The difference is that the physiological leaf roll allows plants to develop normally, with healthy fruit production.

We do not know the exact cause of this leaf roll. It seems more prevalent in wet seasons (especially where drainage is poor) and seems more widespread after deep and close cultivation or severe pruning. There is also a noticeable difference in varieties. No treatment is needed or recommended. (*Nancy Pataky*)

Fire Blight Update

Fruit pathologist Steve Ries reports that fire blight is now prevalent in all areas of the state. With the recent hot weather, he would not expect to see much spread of the disease. Above 85°F, the pathogen does not spread; and, at 95°F, disease development ceases. Still, we are not through with fire blight until about mid-July. The recent rain storms with high winds were ideal for spreading fire blight. The wind served to create wounds for infection, and the bacteria are easily transmitted in blowing rain. This disease and its control are discussed in detail in issue no. 2 of this newsletter. (*Nancy Pataky*)

Apple Scab Update

Apple scab continues to be a problem in Illinois, with defoliation about one month ahead of normal on scab-infected trees. This has resulted in some fairly severely denuded trees and numerous calls from concerned homeowners. Treatment remains centered on improving tree vigor to help new leaf production. Watering with 1 to 2 inches of water weekly in periods of drought is advised. (*Nancy Pataky*)

Turf: Summer Patch and Necrotic Ring Spot

Summer patch and necrotic ring spot (formerly *Fusarium* blight) produce nearly identical symptoms. Both diseases appear following 10 days of hot, dry but muggy weather, so we can expect to see this disease at any time now. Disease severity is worst in midsummer. Particularly vulnerable is grass that is under stress for various reasons, including grass that is cut too short; over- or under-fertilized; or weakened by drought, chemicals, or other pests. Also vulnerable is grass that has short roots from poor watering practices.

Two fungal pathogens are usually blamed for the appearance of this disease, but others are involved in the disease complex. Symptoms include scattered, light green patches, typically 2 to 6 inches in diameter. The patches enlarge and rapidly fade to a dull reddish brown, then a light tan, and finally straw color. The patches may be sunken streaks, crescents, or roughly circular, and 1 to 3 feet or more across.

Bluegrass tends to form a roughly circular, doughnut-shaped area of dead or stunted grass up to 2 or 3 feet across, with tufts of green grass in the center, giving a "frog-eye" pattern. Plants die with a reddish brown dry rot of the roots and crown. When temperature and moisture are high, a white to pink mycelial growth and masses of spores can sometimes be seen on the lower stem, crowns, and roots near the soil surface.

The best control measures for this disease complex are to follow faithfully the cultural controls outlined in *RPD*, no. 408. The only two fungicides that control both diseases are Rubigan and Banner. As for control of other diseases, applications should start before symptoms become evident, and a second application should go on 14 to 21 days later. Banner and Rubigan can be supplemented by one of the following fungicides: Bayleton, Chipco 26019, Cleary's 3336, Fungo, or Sentinel. It is important to drench the fungicide into the root zone, using 1/2 inch of water (300 gallons per 1,000 square feet). The turf area should be thoroughly watered the day before applying the fungicide drench, using 300 to 450 gallons of water per 1,000 square feet (which equals 1/2 to 3/4 inch). A series of juice or coffee cans in the path of the sprinkler can help you determine how much water has been applied.

Homeowners are not usually interested in spending the amount of time and money necessary to control this disease with chemicals, and we certainly would not promote chemical controls for turf diseases on home lawns. Once the disease is identified, look into purchasing a blend of grasses that offer disease resistance or tolerance to the pathogen and still will do well at the site in question. Rake out the dead grass, work up the site according to sound turf-preparation practices, and reseed the area in late August. This method is inexpensive and should provide you with less-intense turf care over the future. (*Nancy Pataky*)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
illinois natural history survey, champaign

NEWSLETTER

No. 11 • July 5, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report, June 26–30

Honeylocust plant bug activity has tapered off, and honey locust trees are beginning to grow out of the problem in northern Illinois. Damage may persist for a while until the new growth shows up. Some trees still are slow to leaf out; but, with the recent rains, they should be able to catch up. Ash plant bug damage is quite prevalent on ash, with the end of the first generation. Most ash do not appear to be severely affected, but they may raise concern with homeowners. New foliage should replace the damaged areas.

Moderate to heavy leaf-curl aphid damage is also occurring in northern counties. Leaves appear curled and distorted, and damage may resemble either mite or herbicide injury. Acephate (Orthene) may be used, but treatment is usually not warranted. Natural enemies should control aphid populations later in the season. Other aphids are appearing on spiraea, hawthorne, and crabapple now that chronic rains (that is, May) have tapered. Observations at the Morton Arboretum have revealed large numbers of ladybird beetle larvae and adults feeding on aphids. Sprays should be used carefully to avoid killing natural enemies of the aphids. Softer materials such as soaps and oils may be used for aphid control.

Red maple trees are showing feeding damage from the potato leafhopper. New growing tips will be distorted, darkened, and stunted. Leafhoppers are

usually present on the underside of the leaves. Severe infestations can greatly reduce the current year's growth. Insecticides can be applied when leafhoppers are present but will do nothing to eliminate damage that has already occurred.

Black turfgrass atenius larvae are active. Scout for them, feeding on turf root systems in fairway swales, at the base of greens' aprons, and anywhere else on the golf course where water tends to accumulate. These insects will be concentrated in these locations, particularly with the heavy rainfall that we experienced in May. These fully grown, C-shaped larvae are about 3/8-inch long, white grubs. Fifty or more per square foot can cause damage and warrant treatment.

Adult Japanese beetles are out and actively feeding on host plants in infested areas in southern and central Illinois. See the article in this newsletter for more information on control of adult beetles.

The egg masses of cottony maple scale hatched this week throughout central Illinois. The crawlers look like little orange dots crawling on the white egg masses and on twigs and leaves of the host plant. Foliage feeding is beginning. For management recommendations, see last week's newsletter. Other soft-scale crawlers are also hatching throughout the state. Soft scales that may be in the crawler stage now are lecanium scales, pine tortoise scale, european elm scale, and fletchers scale. Tulip tree scale and magnolia scale crawlers are not active, and treatments at this time will be ineffective.

Mimosa webworm webs should be noticeable on honey locust and mimosa throughout central and southern Illinois. Young caterpillars are susceptible to *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide). Treatments to this first generation will likely reduce problems from the second generation later in the season. Other defoliators becoming active in central and southern Illinois include early generation fall webworm and bagworms.



Mike Morrissey, urban IPM field scout in Edwardsville, also reported finding aspen blotch miner on aspen, hawthorn lacebug eggs on hawthorn, and horntail adults ovipositing on elm.

Management recommendations for most of the pests just mentioned are available in the *1995 Illinois Urban Pest Management Handbook*. (John Lloyd, Fred Miller, Phil Nixon, and Tom Royer)

Japanese Beetles

I have received several Japanese beetles for identification during the week of June 19 to 25. These beetles are a pest of many ornamental landscape plants, as well as soybean, corn, blueberries, and brambles, in Carroll, Champaign, Coles, Cook, DuPage, Edgar, Iroquois, Kankakee, Lake, Lawrence, Madison, Marion, Monroe, Park, Peoria, Rock Island, St. Clair, Vermilion, and Winnebago counties. We can expect to see these beetles into mid-August.

This beetle feeds on a number of plants but seems to prefer roses, raspberry, grape, and crabapple. It will feed on the surface of fruits, causing scarring and irregular damage. It also feeds on foliage, creating chewing damage at the margins of leaves, and will destroy some flowers.

The adult Japanese beetle measures 1/3 to 3/5 inch and has copper/metallic-colored wing covers and a shiny, green head and thorax. There is a row of small white dots just below the wing covers and two white spots near the tip of the abdomen. The immature stage is one of several "grubs" that feed in turf.

Control of adult beetles is difficult because they emerge every day for several weeks to a month. Generally, surface sprays of carbaryl (Sevin) or cyfluthrin (Tempo) reduce damage for two to several days, but multiple applications are required to maintain control. Although Japanese beetle traps are widely available for purchase, research conducted in Kentucky suggests that they are not effective in controlling moderate to heavy infestations; and they may attract more beetles into a yard than would occur otherwise.

The adult females will be busily mating and laying eggs in the soil. The eggs hatch into white, C-shaped grubs that feed on the turf roots. Japanese beetle grubs can be controlled with an appropriately timed application of a registered grub insecticide for turf. Japanese beetle grubs are also susceptible to milky spore disease, which can be purchased in many garden centers. Remember that milky spore disease will control ONLY Japanese beetle grubs and will not harm annual white grub, the more prevalent pest of turf. (Tom Royer, Extension educator, IPM, 618/692-9434)

Annual White Grub Flight

Adult annual white grubs will be out in southern and central Illinois and should appear next week in northern Illinois. These are 1/2-inch long June beetles that are tan, with black faces (hence the name, masked chafer). They will be most active flying across the turf from about 10 p.m. to midnight. Car headlights shining across the turf will easily pick them up as they fly about searching for mates and looking for sites to tunnel into the soil to lay eggs. They are also strongly attracted to street lights, porch lights, and other bright lights. These beetles do not feed as adults and die in about 2 weeks.

Their relative abundance, together with the level of dormancy of unwatered turf, provides an early indication of the likelihood of damage later in August and September from the larvae feeding on turf roots. These beetles are attracted to vigorously growing turf with damp soil, which will be present in irrigated turf. If the unwatered turf in the area has received enough rainfall to be vigorously growing, many of the beetles will lay their eggs in these areas, reducing the number of eggs laid in irrigated areas. If the unwatered turf is dormant, off-color, or brownish and not actively growing, the beetles will concentrate their egg-laying in irrigated areas, which usually results in high populations of grubs and associated turf damage in mid-August through the fall. The spotty rainfall that we have experienced during the last month will likely result in damage in some areas, with little or no damage in nearby areas that experienced some localized rainfall.

Control is achieved by applying the proper insecticide in the first half of August to control the grubs once it is determined by scouting that there are enough grubs to cause damage. If imidacloprid (Merit) is used for control, treatment should be applied soon. (Phil Nixon)

Black Vine Weevil

Adults of black vine weevil have emerged and started feeding on leaves. Look for the typical semicircular leaf notching around the edges of leaves on yew, euonymus, and other plants. New notches will look fresh. Old damage from last year will have a brown area around the periphery of the leaf notch. If you want to find the weevils, look at shrubs at 11 p.m. with a flashlight (I suggest you stay in your own yard to do this). Look fast, because the adults will drop off the foliage if disturbed.

Shrub beds with heavy adult weevil activity may suffer from larvae feeding on shrub roots in August

and September. Unfortunately, the preferred hosts for the adult weevils may or may not be the same preferred host for the grubs. Treat all the plants with new leaf notches with acephate (Orthene), or other compounds listed in the *1995 Illinois Urban Pest Management Handbook*, to reduce the number of weevils that will be laying eggs in July. (Modified from an article written by Dave Smitley, Michigan State University)

PLANT DISEASES

Chemical Update

Recently, it has been brought to our attention by a chemical wholesale dealer that a relatively new product is available, called Halts. Actually, it has been on the market for over a year now by the Fertilome company. Many of you are very familiar with the Cleary Chemical products, but these are not always available to the homeowner. Fertilome is another chemical company that has a product called Halts, with the same active ingredient as Cleary 3336, but is sold on a retail level in small containers for homeowner use. Many of your homeowner clients may want to consider this product when trying to control the many root rots present in the garden this year. As with the other fungicides available, it is a preventive measure, not an eradicant. At this point, we do not have any research on hand to demonstrate efficacy of this product compared to the other root rot controls. (Nancy Pataky)

Root Rots of Bedding Plants

If your garden plants are stunted or low in vigor or easily wilt on a warm day, the problem may be root rot. In such a case, the foliage may turn yellow to brown and drop prematurely, usually starting with older leaves and moving up the plant. The severity of the root rot depends on the fungal pathogen, the susceptibility of the plant, and the soil conditions. With all the moisture we had earlier in the season, infection by the root rot pathogens was common. The pathogens can become dormant in the plant when conditions are dry, but activity resumes with added moisture.

If a root rot is suspected, the plant should be carefully removed and its roots washed and examined for indications of rotting. A healthy plant has numerous white roots that appear fibrous. Roots from a diseased plant show various degrees of water-soaking and usually are some shade of brown or black.

Aboveground symptoms similar to those of root rot may be caused by environmental factors like a lack or excess of water, poor drainage, too deep planting, accumulated salts in the soil, insufficient light or nitrogen, potbound roots, and a sudden change in the environment. In garden flowers, environmental conditions that most often cause symptoms similar to those of root rot are an excess or lack of water or insufficient nitrogen. This year's excessive water, along with inadequate drainage in some cases, may be the main problem. Root rot pathogens follow, making it difficult to determine which came first, like the chicken-and-the-egg story.

There are many root rot pathogens, but the major fungi that will be encountered in flowers are *Rhizoctonia*, *Fusarium*, *Pythium*, and *Phytophthora*. In a simplified view, we can group the first two fungi as those causing a dry rot and often a reddish pink cast to roots. *Pythium* and *Phytophthora* can be grouped as the types causing a soft, brown-to-black rot of the roots. This second group is known as "water molds" and requires saturated soils to infect.

Control of root rots should be aimed at prevention. This includes use of resistant varieties when root rots are known to be a problem, use of healthy transplants, proper site preparation to provide good water drainage away from roots, use of balanced fertilizer, and rotation in the garden plantings for 2 or 3 years with unrelated annual flowers to help prevent the buildup of pathogens in one area. Remove crop residue at the end of the season to help reduce pathogen survival.

Despite good preventive practices, root rot disease may still occur. Fungicides are available to the major groups of fungi mentioned but are not registered on all ornamentals. Specific hosts and chemicals registered for disease control are listed in the *1995 Illinois Urban Pest Management Handbook*. Details about the root rots are given in *Report on Plant Diseases*, no. 615. (Nancy Pataky)

Stewart's Wilt on Sweet Corn

Despite the earlier cool, wet weather, sweet corn is now up and growing in most parts of the state. Because the winter was mild, flea beetles are also doing well this year. The combination of the two generally means high levels of Stewart's wilt, and this season is no exception. Confirmed cases have been plentiful at the clinic.

The mild winter means a large number of flea beetles have probably survived the winter with the bacterial pathogen, *Erwinia stewartii*, which causes

Stewart's wilt. When the beetles feed, they deposit the bacterium in the feeding wound. The bacterium enters the plant, where it can multiply and spread.

If flea beetle feeding is evident, Stewart's wilt symptoms can follow in 3 to 14 days. If insecticides are used to help control the disease, they should be applied before the beetles are seen, because the disease may already have been transmitted. To evaluate the risk of Stewart's wilt infection, growers need to know if the variety planted is a susceptible hybrid. Tables listing varietal reactions to Stewart's wilt are in the *Midwest Vegetable Variety Trial Report*, published at Purdue as a multi-state publication. Check with your Extension educator for availability of this report.

Symptoms of Stewart's wilt appear as light green to yellow stripes along veins on the leaves. The stripes may be 1/4 to 1/2 inch wide, with wavy margins. With age, the stripes turn brown.

Varieties resistant to Stewart's wilt are available. Using these varieties is the easiest method of control. Growers wanting early season varieties will find less of a selection, but later varieties have much to offer.

Normal sugary hybrids with good resistance include Honey n Frost, More, Prime Pak, and Sweet Tennessee. Resistant, sugar-enhanced (SE) hybrids include Merlin, Miracle, Summer Flavor 79Y, Tuxedo, Ambrosia, Seneca Wardance, Argent, Coronation, and Silverado. Resistant super sweet (shrunk or SH2) hybrids include Flagship, Florida Staysweet, Sch 5170, SsuperSweet 7210, SsuperSweet 7630, and Sweet Success. Hybrids that are susceptible to the disease include Jubilee, Sundance, Platinum Lady, Sugar Buns, Phenomenal, Supersweet Jubilee, and most hybrids that are early in maturity (although recent work has helped the early selections). The sweet corn breeders have great fun with name assignments! A newly revised *Report on Plant Diseases*, no. 201, is available through the Extension plant pathology office. This report has updated information and is available in the new color format at \$1 per copy. (Nancy Pataky)

Dollar Spot of Turf

Most diagnosticians do not enjoy working with turf samples because it is so difficult to distinguish the diseases in the lab. Also, many noninfectious causes can resemble infectious problems. Dollar spot,

however, is one that you can ID in the field. It infects creeping bentgrass, Kentucky bluegrass, annual bluegrass, and fine-leaf fescues. Even Bermuda grass and zoysia grasses can become infected.

As the name implies, the disease appears as more-or-less round, brown spots about the size of silver dollars. These spots become brown, straw colored, and somewhat sunken. On lawn grasses, the spots may enlarge to as much as 4 to 8 inches in diameter.

A quick diagnostic guide for this disease involves the appearance of the leaf lesions. Plants that grow at the edges of the affected area show lesions (spots) on the blades. Those lesions girdle the blade, may be up to 1 inch long, and are usually bleached white to light tan, with a dark brown, reddish brown, or purplish border. When dew is present on the blades of grass on overcast days or early in the morning, a white cobwebby growth of fungal mycelia may be seen on infected plants.

Control measures for this disease include maintaining balanced fertility (the disease is worse when nitrogen is low); avoiding late afternoon or evening watering; providing good air circulation in the area by pruning surrounding plants; providing adequate surface drainage; mowing at maximal height; and using a turf cultivar resistant to at least some strains of the dollar spot fungi. Resistant lines are suggested in *Report on Plant Diseases*, no. 407. Chemical controls are available on a protective basis but are generally used only on golf courses. Details are available in the *1995 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

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HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
illinois natural history survey, champaign

NEWSLETTER

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report: July 3-7

Annual white grub adults have emerged throughout Illinois. Adults were first observed in central Illinois on July 5, which is 2 to 3 days later than is typical. Keeping an eye on the heaviness and duration of flight helps give an early indication of how heavy damage to turf might be this fall.

Potato leafhopper damage is still occurring on red maple and other susceptible hosts throughout northern and central Illinois. Bagworms have started forming little bags, and feeding damage will become evident in the next couple of weeks on host plants. More in-depth information on potato leafhopper and bagworm management options is in previous newsletters.

Aphid populations are starting to increase on most plant materials; fortunately, their natural enemies are also becoming more abundant. Lady bird beetle larvae can be found feeding in most aphid populations. Look for insect larvae and adults that are feeding on the aphids before implementing control measures. Many controls will kill the natural predators and parasites that are regulating the aphid populations. Spot treatments, treating only the infested portions of the plant, with short-residual insecticides (insecticidal soaps) will be less disruptive of natural enemies, if chemical control is necessary.

The University of Maryland has a publication and slide set available to help in identifying beneficial insects (natural enemies); the title is *Biological*

Control of Insect and Mite Pests of Woody Landscape Plants. The manual (\$22) and the slide set (\$50) may be purchased from University of Maryland, Agriculture Duplicating Service, 6200 Sheridan Street, Riverdale, MD 20737. (John Lloyd, Phil Nixon, Fredric Miller, and Tom Royer)

Gypsy Moth Traps

The Illinois Department of Agriculture, in cooperation with the USDA APHIS program, has placed gypsy moth traps throughout Illinois, north of a line that runs near Springfield in Sangamon County. These traps are triangular in shape and made of orangish red or beige cardboard. They are about 8 inches long and 4 inches wide. The traps are placed on trees and other sites at the rate of one per square mile. They are usually all in place by early July and are removed in August.

The traps contain a pheromone lure that attracts a male gypsy moth from a mile away. When this sex attractant is sensed by the male, he flies upwind, following the increasing concentration until he finds its source. In this case, he flies into the trap and gets stuck on the glue coating the inside surface. There is no insecticide in the traps.

These traps are placed to determine if gypsy moth is in the area. Gypsy moth caterpillars feed on a wide range of trees in the northeastern United States, and this is part of a program to keep gypsy moth from becoming established in Illinois. The presence of a moth in the trap does not mean that gypsy moth is in the area; other species of moths fly into the trap looking for shelter. The presence of gypsy moths in the trap does not necessarily mean that there is a gypsy moth infestation in the area. Traps containing one or a few moths usually represent a few moths in the area, which may or may not become a problem. Most of these catches represent accidentally imported pupae or small populations that die out without becoming a problem. (Phil Nixon)



White Grub Control with Merit

Imidacloprid, sold as Merit by Miles, became available last year for white grub control in turf areas, except for sod farms. Research tests indicate that it provides effective control of white grubs if it is applied properly. It provides considerable longevity. On golf courses where black turfgrass *ataenius* occurs, an application in May followed by another one in July should control not only both generations of black turfgrass *ataenius* but also any of the white grubs, including annual white grub and Japanese beetle. Due to its longevity, application of Merit can be done when the turf manager chooses, rather than when the insect population demands it.

A major drawback with this insecticide is that it frequently takes several weeks after application before it is effective in providing control. We recommend that Merit be included in the arsenal for white grub control but that it not be the only insecticide that you use.

In accordance with Integrated Pest Management principles, we do not recommend that you apply insecticide to every turf area to control white grubs whether it needs it or not. We have previously recommended that the area be scouted in the first half of August to determine grub numbers before making a treatment decision. We still recommend that for all other grub control insecticides except Merit. You should cut through portions of the turf in areas that are likely to have grubs, pull back the turf, and count the number of grubs present. If more than 10 to 12 grubs are present per square foot, insecticides should be applied to prevent turf damage.

With Merit insecticide, if one waits until early August to apply it, it may not become effective in controlling grubs until turf damage has occurred. For this reason, we recommend that Merit be considered for those areas that annually experience treatable grub numbers. This will likely include golf course fairways and heavily irrigated lawns. Areas that are very likely to have grub damage should also be considered for treatment by Merit. An example of an area that should be considered for control by Merit is irrigated turf during dry years when surrounding unwatered turf is dormant and the adult annual white grub beetle flight has been large.

Other shorter-lived, but more quickly acting, insecticides should also be included in your grub-control arsenal. Trichlorfon (Dylox or Proxol), bendiocarb (Turcam), isozofos (Triumph), and other insecticides are examples of products that should be used to control areas missed during Merit application

and to provide control where waiting until the first half of August to determine need for treatment is proper under Integrated Pest Management principles. (Phil Nixon)

Deer Flies, Not Dear Flies

We've received many calls this week from people in rural areas that are being attacked outside by biting flies. Deer flies are slightly larger than house flies, with green or golden eyes, a yellowish to black body with stripes on the abdomen, and brown patterns on the wings. In spite of their outward beauty, they are blood feeders and can inflict a painful bite on warm-blooded creatures (including humans).

Unfortunately, deer flies do not have the subtle surgical skills of mosquitoes. When the female deer fly feeds on a host, it slashes the skin with its knifelike mouth parts and laps up the blood from the open wound. Male deer flies feed on nectar, honeydew, plant juices, and other liquids.

Deer flies in Illinois typically have one generation per year. Adult females lay eggs in marshy areas with muddy or damp soil. Larvae hatch from the eggs and burrow into the soil, where they feed on organic matter. The larvae overwinter and pupate in the spring under 1 to 2 inches of soil. When the adults emerge, they fly to nearby foliage and start looking for food. Deer flies are more common near undisturbed natural areas, hence their apparent abundance in rural settings. They are also more active on warm sunny days when there is little or no wind.

Environmental manipulation and insecticide use on larval habitats are impractical for deer fly control. Research has shown that deer flies are attracted to dark moving objects. One method of avoidance is to wear light-colored clothing. Repellents with the compound DEET may provide some relief if they are reapplied frequently. Deer fly control methods for livestock are listed in the *1995 Illinois Agricultural Pest Management Handbook*. (John Lloyd)

PLANT DISEASES

Brown Rot of Stone Fruit

Fruit pathologist Steve Ries says that brown rot of stone fruits is now showing in southern Illinois peaches. We usually see it first in apricot and cherry, but the disease is not as severe in those crops because they are affected earlier and fungal inoculum has not yet increased to damaging levels.

Brown rot causes easily distinguishable, fluffy, brown rot of the fruit of the peach, nectarine, plum, prune, sweet and sour cherry, apricot, almond, and Japanese quince. Because it is most severe in areas with frequent spring and summer rains, this is another common disease to expect in 1995.

Brown rot is caused by the fungi *Monilinia fruticola* and *M. laxa*. They may infect blossoms, fruits, twigs, and small branches and require some type of wound or insect injury to infect. In warm, damp conditions, the fruit quickly turns light brown, followed by development of tan-to-gray spore tufts, giving it a fuzzy appearance. The rotted fruit eventually shrinks and blackens, giving it a mummified appearance. These mummies may stay attached to the tree.

Brown rot is not known to cause leaf infection. Besides fruit rot, however, it may infect flowers, resulting in wilting and the production of the same spore tufts as seen on the fruit. If the fungus invades stems, cankers result. Often the cankers ooze gum or sap.

Control the disease by reducing the inoculum. This means removing mummified fruit and pruning out infected twigs or cankers. Sanitation is important to both home growers and commercial growers. Insect control is also essential to control of brown rot because insects provide the wounds needed for infection. Ries states that home growers can decrease disease incidence by harvesting timely (fruit is still somewhat hard), harvesting carefully to limit fruit injury (where infection will occur), and refrigerating fruit immediately. Commercial growers should consider fungicide sprays now. The recommendation is to spray during bloom and again 2 weeks before harvest. Consult Circular 1292, *Midwest Tree Fruit Handbook*, for suggested pest control and other help for commercial fruit growers. Brown rot is discussed in detail in *Report on Plant Diseases (RPD)*, no. 804. (Nancy Pataky)

Leaf Blotch of Peony

This disease, which affects all aboveground parts of peonies, is caused by the fungus *Cladosporium paeoniae*. It is most serious in large plantings, where plants are dense and grown closely together and the old tops are not destroyed in late fall or early spring. Because rains have been frequent this year, we have seen an abundance of this disease. Small, circular, red or purple spots ("measles") appear on the upper surface of young leaves just before the peony blooms.

Later, the spots appear on the under-leaf surface. The lower sides on infected leaves soon turn a dull chestnut brown, while the upper surfaces appear a glossy dark purple. As the host tissues mature, the lesions enlarge rapidly and may form large, irregular blotches that make affected plants unsightly. Spots on flower buds, floral bracts, petals, and seed pods resemble those on the leaves. Stem and petiole lesions are short, reddish brown streaks at first. The lesions on stems near the soil line become somewhat sunken or pitted and tend to merge and darken. Spots on all plant parts remain purplish or brownish red throughout the season.

We have seen this disease appear frequently in the last 2 years, undoubtedly because the growing seasons have been so wet. The disease has become a concern for growers with large collections of peonies. In the fall, or in the spring before new growth emerges, remove all old tops to the ground level and destroy them by burning or removal from the area. Just before the shoots break through to the soil surface in the spring, spray the soil around the plants with mancozeb or maneb. Use one gallon of spray to cover 200 square feet. Be sure to soak the soil surface area, stem stubs, and any other peony debris that may remain. Spray the plants weekly during cool, damp, overcast weather, starting when the new shoots are 2 to 4 inches tall; and continue until the flowers begin to open. The addition of a spreader-sticker (surfactant) to the spray will aid in coverage. The sprays are protective sprays to prevent infection from occurring. These sprays also control the less serious *Botrytis* blight, bud blight, and shoot blight disease. For more information, read *RPD*, no. 631, "Red Spot, Leaf Blotch, or Measles of Peonies." (Nancy Pataky)

Leaf Scorch of Trees

Many of our readers have questioned the Plant Clinic about a bacterial disease called leaf scorch. Because of those questions, we are running this article, which also occurred in issue no. 10 of the 1994 newsletter.

Most of you are familiar with the noninfectious leaf scorch that occurs on trees or shrubs each year. Fewer people are aware that there is also an infectious leaf scorch caused by a xylem-inhabiting bacterium.

The noninfectious leaf scorch occurs whenever water cannot be translocated to the foliage rapidly enough to replace lost moisture. The causes vary and include root injury, root rot, poor soil conditions, high winds, transplant shock, flooding, and drought. A

complete listing of possibilities is discussed in *RPD*, no. 520.

The infectious leaf scorch is called bacterial leaf scorch and is caused by a bacterium called *Xylella fastidiosa*. It occurs mostly in the eastern and southern states but has been reported in western Kentucky. The disease occurs on elm, oak, sycamore, mulberry, and red maple. Look for scorch symptoms that occur in early summer to midsummer and then intensify in late summer. The symptoms occur first on one branch or one section of branches. Each year, the number of branches affected may increase. Unlike noninfectious scorch, bacterial leaf scorch develops first on the oldest leaves and progresses toward the tip. Also, infected leaves often remain attached until autumn.

Until 1994, we had received no confirmed cases of bacterial leaf scorch in Illinois. A tree specialist in Belleville sent samples to AGDIA, Inc., a private lab in Indiana, where a very specific ELISA (enzyme-linked immunosorbent-assay) test confirmed the presence of *Xylella*. Now, bacterial scorch has been confirmed in Illinois.

If you have a questionable sample that has a history of progressive scorching, you may want to seek lab help for bacterial scorch testing. The Plant Clinic cannot do the lab test required to confirm this disease, but staff can help with sample preparation and can forward materials to the appropriate lab. Call the Plant Clinic at (217)333-0519 if you have a suspect sample to be tested. (*Nancy Pataky*)

Crown Gall

Crown gall is caused by a bacterium, *Agrobacterium tumefaciens*. It appears as galls or overgrowths on the trunk, crown, or roots, and sometimes on the stems. The galls are initially white or tan, more or less round, and quite soft and spongy when new. As a gall ages, it develops an irregular, convoluted, rough, corky surface and a hard, woody interior, with the color becoming dark brown. Insect galls may look similar to bacterial galls; but, when cut open, the insect galls contain tunnels or pockets, sometimes containing insects.

The causal bacterium of crown gall can survive for many years in the soil on organic debris. It is easily spread in soil water or rain splash but can only penetrate plants through fresh wounds. Such wounds might be made during pruning, cultivating, transplanting, budding or grafting, or feeding by insects or other pests.

Crown gall invades a number of hosts but is probably most common in Illinois on euonymus, grape, raspberry, and rose. The disease interferes with transport of water and nutrients, which makes infected plants stunted, weak, and more susceptible to winter injury.

Control of crown gall is difficult. Begin by digging and destroying all severely infected plants, but be certain that crown gall is actually present. Early galls can be confused with callous tissue. Consult *RPD*, no. 1006, for details and photos of crown gall. In some cases, crown gall may be present but seem to have little effect on plant growth. Such plants can remain until growth declines.

Do not replace infected plants with the same species. The bacterium is soilborne and will infect the new plants. Also, before purchasing new plants, inspect them closely for galls.

This disease has been a problem in the nursery industry because plants purchased without visible galls have been known to develop galls later. Federal inspectors have helped by ordering galled plants to be destroyed, and nursery growers are quick to comply. The ability of this organism to survive adverse conditions and multiply within the plant, however, makes this disease difficult to control. Often the disease can be present without gall formation, so despite efforts by producers, infected plants may be moved within the nursery trade. (*Nancy Pataky*)

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EDUCATIONAL OPPORTUNITIES

University of Illinois Horticulture Field Day

The 1995 University of Illinois Turfgrass, Nursery, Landscape, and Trial Garden Field Day will be Thursday, August 3, at the University of Illinois Landscape Horticulture Research Center and the Hartley Selections Garden. This annual event is planned to provide up-to-date information and education to all professional turfgrass, nursery, landscape, and garden-center personnel.

Morning sessions on current research activities in turfgrass, nursery, and the landscape will be augmented with afternoon educational sessions on new technologies and problem diagnoses. Registration is \$25. If you preregister before July 27, you will receive lunch. On-site registrations are still \$25, but lunch is not included.

For further registration information and preregistration forms, contact the Department of Horticulture, University of Illinois, (217)333-7847.

Insect Management on Woody Plants Workshop

The North Central Entomological Research Committee Concerned with Insects Affecting Woody Ornamental Plants is planning a hands-on demonstration of insect pests of shade trees and integrated pest management technologies for the landscape industry. The

2-hour training program will be at Robert Allerton Park, Monticello on September 27 from 2 to 4 PM.

Entomologists from universities in the North Central Region will conduct the workshop. It is an opportunity to learn from the experts. A \$10 preregistration fee per person is required. Because of space restrictions, registration is limited to 20 individuals. Call (217)333-6653 for reservations and information. After your reservation is made, send a check for \$10, payable to University of Illinois, to NCR-98 Workshop, c/o John Lloyd, Extension Entomology, 172 Natural Resources Building, 607 E. Peabody Dr., Champaign, IL 61820.

Biological Control of Insects Workshop

An Extension conference on the biological control of pests and their use in pest management will be November 2 and 3 at the Purdue-West Lafayette campus. Farmers, Extension educators, agricultural instructors, crop consultants, and greenhouse operators, as well as nursery, landscape, and turf managers will learn how to control insect pests effectively through the use of their natural enemies.

The 2-day program will begin with a session on the basic principles and techniques of biological control, followed by presentations on how biological control currently is being used successfully in the Midwest. An evening program will feature a panel discussion with growers, Extension agents, and organic farmers that will identify the current barriers to implementing biological control in the Midwest. The second day of the conference will feature lecture and laboratory sessions with Extension specialists on specific crops. Participants can attend a special hands-on laboratory to learn how to identify common natural enemies.

Fees for registration are \$45 for each day, or \$75 for the 2-day conference. Fees cover refreshments and course materials, including a manual on the basics of biological control.



This conference was planned by the Biological Control Committee of the North Central Regional Land-Grant Universities (NCR-125).

For technical information, contact Cliff Sadof, Purdue University, 1158-Entomology Hall, West Lafayette, IN 47907-1158; telephone, (317)494-5983; fax, (317)494-2152; e-mail, Cliff_Sadof@entm.purdue.edu

For registration and lodging information, contact Kathy Hyman, Purdue Continuing Education, 1586 Stewart Center, Room 116, West Lafayette, IN 47906-1586; telephone, (317)494-2758; fax, (317)494-0567; e-mail, kfhyman@stew-01.cea.purdue.edu

INSECTS

Erratum

In the last issue of this newsletter, it was stated that imidacloprid (Merit) could be applied for black turfgrass ataenius in May and reapplied in July for grub control through late summer. Two applications are not allowed, due to season-long restrictions on application quantity. The May application should carry through August to control later-occurring grubs. If an additional treatment is needed, another labeled insecticide should be used. Thanks to David Shetlar, Ohio State University, for catching the error. (*Phil Nixon*)

Scouting Report: July 10–14

Annual cicadas are out and buzzing. The immature stage of the annual cicada lives underground for 2 to 5 years, depending on the species, and sucks nutrients from the xylem of the roots. The adults emerge after the prolonged nymphal stage and lay eggs in knifelike slits on twigs and branches. Neither the nymphs nor the adults of annual cicadas cause major damage to plant materials. Control is usually not warranted. Periodical cicadas, 13- and 17-year locusts, are not expected to be out this year.

Bagworms are still actively feeding throughout Illinois. *Bacillus thuringiensis kurstaki* (Dipel or Thuricide), trichlorfon (Dylox), and cyfluthrin (Tempo) should be effective against larger larvae.

We are also noticing damage from twig pruners on trees in southern Illinois. Larvae feeding in terminal branches can deform trees in the landscape and nursery by clipping off terminal leaders. Removal and destruction of broken twigs and branches in the fall will prevent adult emergence in the spring and reduce

future problems with twig pruners and girdlers. (*John Lloyd and Noel Troxclair*)

Japanese Beetle Adults: Homeowner Suggestions

With the increased numbers of adult Japanese beetles in several areas of Illinois this year, many homeowners are confused and upset about how to cope with them and their damage. This is causing problems for professional landscape maintainers and Extension educators in providing help to these homeowners. Following are our suggestions for management of adult Japanese beetles.

An important point to realize is that suggested control measures, particularly the use of insecticides, are not going to provide the level of control of adult Japanese beetles that we have become used to with other insects. For the homeowner, applications of carbaryl (Sevin) will be effective for 4 to 7 days, with more beetles appearing on the plants after that time. With the beetles active from late June into mid-August, constant control during that period will result in a large amount of insecticide being used.

Another factor to consider is that Japanese beetles are not likely to be feeding on every flower, tree, and shrub in the landscape. The adult beetles prefer members of the rose family, including fruit trees, crabapple, rose, raspberry, blackberry, and currant. They also feed heavily on linden, birch, maple, wisteria, and grape. Although they feed on many species of plants, they are not likely to cause much damage to most of the landscape. If insecticide applications are made, only plants under heavy attack need to be treated.

Of the landscape plants that are being heavily attacked, one may wish to limit treatment to those that are very important in the landscape aesthetically. Attacked plants near doorways, heavily used sidewalks, and other very noticeable locations in the landscape should probably be protected. Even heavily damaged plants in less obvious parts of the landscape may not warrant the frequent insecticide application necessary for protection. For instance, a defoliated linden near the back property line may not be that obvious a part of the landscape and need not receive control efforts.

Adult Japanese beetle feeding damage is unlikely to cause the death of any but young plants that are trying to become established. Realize that the leaves on these plants have been producing food for the plants through June and that comparatively little

production is made by the leaves in the latter half of the summer. Probably the biggest impact to plants defoliated by Japanese beetles is that they will likely re-foliate in late August. This re-foliation will stress the woody plant to produce these leaves, with little growing season available for the leaves to produce food for the plants.

Well-established, healthy plants should survive even total defoliation by Japanese beetles. Therefore, control efforts should be focused on those plants that are being heavily attacked and are also in a position in the landscape where severe leaf damage would greatly reduce the aesthetic quality of the landscape.

Japanese beetle traps have little use in protecting a landscape from a heavy attack by adult Japanese beetles. In an area where the beetles are very numerous, the traps have been shown to attract more beetles into the landscape than normal. Once attracted into the landscape, many beetles do not fly to the trap but are attracted to host plants nearby. The result is that a landscape containing Japanese beetle traps likely experiences more feeding damage than one with no traps. In areas with rather light numbers of beetles, Japanese beetle traps placed at least 50 feet away from susceptible plants can help reduce damage, but they are still likely to attract more beetles into the landscape than normal. (*Phil Nixon*)

PLANT DISEASES

Oak Wilt

This disease is a vascular wilt caused by a fungus (*Ceratocystis fagacearum*) that enters the water-conducting vessels of the sapwood and causes them to become plugged. Symptoms vary, depending on the species of oak involved. Generally, oaks in the red-black group develop discolored and wilted leaves at the top of the tree or at the tips of the lateral branches in late spring and early summer. The leaves curl slightly and turn a dull pale green, bronze, or tan, starting at the margins. Usually by late summer, an infected tree has dropped all its leaves.

Oaks in the white-bur group generally show symptoms on scattered branches of the crown. Leaves become light brown or straw-colored from the leaf tip toward the base. The leaves curl and remain attached to the branches. The tree may die in one season, but it may also survive for many years with a stagheaded appearance.

Oak wilt is particularly threatening because there is no complete control or cure once the fungus infects.

The disease infects through fresh wounds and can spread by root grafts between trees. You may not save the infected tree, but you may be able to save surrounding trees. Although the disease has been found as far south as Marion in this state, it is more common in the northern parts of Illinois. A positive diagnosis requires laboratory confirmation. The Plant Clinic has confirmed cases this year in Adams, Cook, and Champaign counties. We also had a report from Rex Bastian of Hendrickson the Care of Trees, who states that they have laboratory confirmation of six oak-wilt cases in the northwest suburbs of Chicago, five on red oak and one on bur oak.

If you think a tree is infected with oak wilt, the Plant Clinic can culture the wood to detect this fungus. The sample should be 6 to 8 inches long, about the thickness of a thumb, alive but showing symptoms, and containing vascular discoloration. To detect the discoloration, peel the bark back with a knife. The sapwood of a healthy tree is white or tan. A tree suspected of oak wilt shows brown and white streaking of the wood. Samples without streaking have never yielded the oak wilt fungus in our lab. Culturing a sample for a vascular disease such as oak wilt requires about 7 days of incubation before the fungus develops to the point at which it can be identified.

Other problems can mimic oak wilt, including anthracnose, construction damage, soil compaction, changes in the soil grade or water table, lightning damage, nutritional disorders, insect and animal injuries, chemical damage, cankers, and root decay. None, however, has the distinct vascular discoloration found with oak wilt. When sending a sample for testing, be sure to list some of these factors if they apply. Adding 6 inches of topsoil over a root stem or building a home in a grove of oaks can kill a mature oak tree in 1 to 7 years. These factors may also weaken the tree so that it is more susceptible to oak wilt. Oak wilt does not cause leaf distortion. Refer to *Report on Plant Diseases (RPD)*, No. 618, for more on this disease. (*Nancy Pataky*)

HORTICULTURE

Diagnosing Herbicide Injury

This year, herbicide injury inquiries to University of Illinois Extension specialists have been above average. By far the majority of complaints involve growth-hormone herbicides, such as 2,4-D. Subjects of other inquiries include Roundup, soil sterilants, and

farm chemicals, such as Gramoxone-Extra and Command.

Diagnosing nontarget herbicide injury is difficult because other plant disorders can mimic herbicide injury symptoms. These other causes include mites, insects, diseases, and certain environmental conditions. Accurate diagnosis requires knowledge of the symptoms produced by a particular herbicide on a specific plant. Herbicides produce very specific injury symptoms, depending on their mode of action.

There is considerable plant injury this year from growth-hormone products, such as 2,4-D, MCPP, and dicamba. These herbicides cause twisting, curling, and abnormal growth of the newest tissues. Damage is generally from vapor or particle drift onto the foliage. Vapor drift causes a considerable amount of damage; it can occur days after the application and can move long distances. In addition, dicamba is readily mobile in the soil and can move into the root zone of susceptible plants.

Roundup is absorbed and moved through foliage and green stems. Damage can occur through drift or by spraying sucker growth. Injury symptoms may include chlorosis, necrosis, and witches'-broom effect.

Gramoxone-Extra and Finale cause contact burn on plant foliage. Drift injury causes necrotic spotting on leaves, while complete spray coverage causes general necrosis. "What you see is what you get." The injury will not spread or increase in intensity.

Soil sterilants such as Hyvar, Spike, and Pramitol are nonselective and have long residual activity. They can cause serious injury and even death to nontarget plants. Injury symptoms vary depending on the herbicide's mode of action. Treatment to even small areas, such as cracks in pavement, can kill a large tree if the sterilant is applied within its root zone.

Command is a pigment inhibitor. Injury to ornamentals can occur from spray drift, volatilization, or application to the root zone of desirable plants. Injury symptoms appear in the new growth first and include veinal or interveinal, marginal or general bleaching or whitening of plants.

Several commercial laboratories can test for herbicide residues in both plant tissue and soil. Call the Illinois Department of Agriculture (IDA), (217)785-2427 to obtain a list. Herbicide complaints should be directed to the IDA Pesticide Hotline, (800)641-3934.

Plant samples can be sent to the University of Illinois Plant Clinic, but remember that only a visual analysis based on symptoms present and facts given can be done. The Plant Clinic cannot do herbicide residue studies, and the analysis they do give may be inconclusive because herbicide injury symptoms mimic so many other problems.

Next issue: Clues to look for, recovery, and preventing future injury. (*Rhonda Ferree*)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
illinois natural history survey, champaign

NEWSLETTER

No. 14 • July 26, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Late-Season Defoliators

Leslie Marsh, urban IPM scout in Champaign-Urbana, collected early instar (young) yellownecked caterpillar larvae on newly planted paper birch in the Mahomet area. Larvae hatch from eggs and feed gregariously on a variety of deciduous hosts, including crabapple, linden, oak, hickory, maple, and birch. Complete defoliation of the host tree is possible in severe infestations. Young larvae skeletonize leaves while feeding, whereas older larvae eat the entire leaf.

The caterpillar's name is derived from the bright orange and yellow segments behind its head capsule. Young larvae are red, with pale yellow lines running the length of their bodies. As the larvae mature, the red coloration turns black. Larvae have a unique defensive reaction to disturbance. When they are disturbed, they raise their heads and abdomens in the air in an attempt to frighten off predators.

Bacillus thuringiensis var. *kurstaki* (Dipel or Thuricide) is an effective insecticide for treating young yellownecked caterpillar larvae. Malathion, chlorpyrifos (Dursban), and acephate (Orthene) also provide control.

In addition to yellownecked caterpillar, other late-season defoliators are beginning to hatch. An adult female white-marked tussock moth was collected this week from a hickory tree on the

University of Illinois campus. She was in the process of laying a frothy mass of eggs. Defoliation damage from the second generation of caterpillars, which will hatch from the eggs, will become evident in the next few weeks.

White-marked tussock moth larvae feed on the foliage of more than 50 species of trees. Young larvae skeletonize leaves, and older larvae eat everything except the main veins and petioles.

Larvae have red-orange heads and yellow bodies, with a black stripe and four tufts of yellow hairs on the back. Adult female moths are wingless and about 1/2 inch long, whereas males have a wingspan of about 1 inch. Tussock moth larvae may cause extensive defoliation but do not exhibit the gregarious feeding habit or the defensive response of the yellownecked caterpillars.

Management of tussock moth larvae with *Bacillus thuringiensis* var. *kurstaki* (Dipel or Thuricide) is effective when the larvae are small. Malathion and carbaryl may also be used to control white-marked tussock moth caterpillars. (John Lloyd)

Planthoppers

Planthopper nymphs are being found on a variety of trees, shrubs, and flowers throughout Illinois. They are most easily noticed by the white, waxy, cottony material produced by the nymphs; it coats the stems and leaf undersides.

Planthoppers are sap-sucking insects in the superfamily Fulgoroidea. Those that are being found at this time are primarily in the family Flatidae. The flatid planthoppers as adults are 1/4- to 3/8-inch, jumping and flying insects that are most easily recognized by the broad wings covering the sides of the body and legs. The most common species is either purplish blue with white flocking, lime green, or powdery white.

In most years, these insects are most common on rose, grape, and brambles such as raspberry and blackberry. This year, their numbers are quite large;



and they are being found on a variety of trees, shrubs, and flowers, where their white flocculent material literally coats the stems and leaf undersides. Hosts include hickory, pecan, oak, elm, birch, linden, ash, privet, redbud, maple, viburnum, magnolia, dogwood, cherry, crabapple, hawthorn, and black walnut. If one looks closely, the nymph can be found on the stem or leaf underside, completely covered with the white flocculent. Once the nymph that produces the white flocculent molts to adult or leaves, the flocculent degrades and disappears within a few days.

Adults lay their eggs in slits in the stems of the host plants. Neither this egg-laying nor sap-feeding by the nymphs and adults usually causes appreciable damage to the plant. For this reason, control is usually not needed. If it is determined that control is needed, a heavy spray of water can knock the nymphs and some of the flocculent off the plant. Sprays of insecticidal soap or malathion should also be effective. (*Phil Nixon*)

Spider Mites

The long dry spell that we are undergoing in most of Illinois has made many trees, shrubs, flowers, and other landscape plants susceptible to spider mites. They are being found in damaging numbers on burning bush or winged euonymus at this time.

Spider mites are tiny, eight-legged, sap-sucking pests that are more closely related to spiders than insects. They are very susceptible to diseases that kill them and are common under cooler, damper conditions. Under warm, dry conditions, they are able to build up their numbers. When temperatures get into the upper 80s and 90s (°F), their life cycle speeds up to where they hatch, mature, mate, and lay eggs in about 5 days. This allows their populations to explode in numbers and completely overwhelm predators and other natural enemies that normally keep their numbers low.

Damage by spider mites appears as fine stippling or tiny white dots most easily seen on leaf uppersides. This stippling quickly turns brown. The stippling is so small that the individual dots are usually not visible except on close examination. From a distance, damaged leaves appear bronzy to brownish. On the leaf underside, the stippling is not so obvious, but the leaf appears dirty from cast mite skins and the mites themselves. Euonymus, maple, oak, Kentucky coffee tree, honey locust, cotoneaster, and pyracantha are some of the more commonly attacked ornamentals. Winged euonymus shows early red fall color when attacked.

The mites are so small that they are difficult to see on the leaf. Striking or shaking infested leaves over a sheet of white paper results in many of them landing on it, where they can be seen crawling on the white background. Rubbing your hand across the paper squashes the mites, producing red streaks. Numerous mites on the paper indicates numerous mites on the leaves that should be treated. Damaging levels of several mites per large leaf result in a couple of dozen on the sheet of paper.

Control mites with miticides such as summer spray oil, insecticidal soap, dicofol (Kelthane), fenbutatin-oxide (Vendex), dinoclor (Pentac), or bifenthrin (Talstar). Two or three treatments at weekly intervals, 5-day intervals under hot conditions, are needed to obtain control because some mite eggs survive sprays of these insecticides, allowing populations to rebound and cause damage. (*Phil Nixon*)

Tiphiid and Scoliid Wasps

Mark Shaw, grounds manager at SIU-Edwardsville, reported many wasps flying around in several soccer fields, to the concern of parents. These insects turned out to be male tiphiid wasps, a parasite of lawn grubs. Tiphiid and scoliid wasps can play a significant role as natural enemies of turf grubs. When abundant, their flight activity may cause some concern about whether or not they sting. Although they are often quite active when mating and searching for their prey, they rarely sting unless stepped on and should not normally be cause for concern.

Tiphiid wasps exist in various sizes, ranging from 1/2 to 1-1/4 inch long. Some species are black, while others are black with yellow stripes on the abdomen. The family includes several species that have been imported to aid in controlling Japanese beetles, European chafers, and Oriental beetles. Also, several species are native to North America and parasitize Phyllophaga (true white grub) and Cyclocephala (annual white grub). A female tiphiid wasp burrows under the sod to find a grub. After finding one, the wasp stings it, which temporarily paralyzes the grub and allows the wasp time to deposit an egg on the underside of the grub. After hatching, the wasp larva feeds on the grub and finally kills it. Depending on the species, they may be active from June through September.

Scoliid wasps, also known as digger wasps, prey on green June beetle grubs. Adults have black wings and measure about 3/4 inch, with a black body adorned with yellow or orange markings. Adult male and female scoliid wasps fly in a figure-8, or S-shaped,

courtship dance above the turf surface. Female wasps often enter the soil to attack grubs as they are feeding. Grubs are stung, and an egg is laid on each immobile grub by the female wasps. Wasp larvae feed on the grubs, pupate, and hibernate in cocoons until the next year. They are often seen in late August or September in southern Illinois. (*Tom Royer, Extension educator, IPM*)

Tuliptree Scale

Tuliptree scale adults are actively feeding. Infested trees may be attracting large numbers of insects, such as flies, ants, wasps, and hornets. Sometimes these insects, which are attracted to the excreted honeydew, are mistakenly blamed for causing damage to the trees. The excreted honeydew may accumulate in large amounts on the leaves, branches, and areas beneath the trees. When heavy honeydew excretions occur, leaves and branches become black from the development of sooty mold fungi that grow on the honeydew.

The tuliptree scale is a serious pest of the tulip tree (yellow poplar) and magnolias. Infestations become so severe that twigs and branches are completely covered with the scales. Such heavy infestations result in the death of infested parts and rapid decline of the tree. Repeated heavy populations of tuliptree scale can cause severe dieback or even death of entire plants. The damage occurs when the scales (through their piercing-sucking mouthparts) deplete the sap in the inner bark tissue.

The tuliptree scale is a large, tortoise-shaped scale. Adult males emerge and mate with the females in June. The eggs develop within the body of the female, and live crawlers hatch in August and September; as many as 3,000 crawlers may be produced by a single female. The crawler, which is the stage to control, is about the size of a pinhead. Crawlers settle on the twigs in the fall and begin to feed.

Control tuliptree scale with petroleum oil applied in late winter, when the plants are still dormant. Alternatively, make two applications of malathion about a week to 10 days apart after the crawlers have begun to hatch (August to September). An early spring application of malathion also is effective. (*Noel Troxclair, Extension educator, IPM, Marion Extension Center, 618/997-3919*)

Zimmerman Pine Moth

The larvae of the Zimmerman pine moth are in their last stages of development, and the large larvae are

causing considerable pitch mass growth on infested pines. Scotch, red, and Austrian pines seem to be the species most commonly attacked. Heavily infested trees may have a pitch mass under each branch in the upper two or three whorls.

The larvae burrow into the sapwood and occasionally into nearby shoots. When the burrows are within a whorl base, branches may break out or suddenly die. Sometimes the entire top of an infested tree breaks out in the wind. Younger trees usually experience the greatest damage.

We recommend that nursery producers remove and destroy trees with several pitch masses or trees with branches breaking out. Homeowners can scrape back the pitch mass to find the pink to red-brown caterpillar burrowing below. Simply cut or puncture the larva. Sprays or injections are probably of no value at this time.

Insecticide sprays with chlorpyrifos (Dursban) or dimethoate (Cygon) are recommended in the third week of August, in an attempt to kill the new generation of larvae that feed at the base of new buds from late August into September. The only other time to treat this pest is in the spring, when the overwintered larvae move into previously damaged spots on the tree. (*John Lloyd, adapted from an article written by Dave Shetlar, landscape pest specialist, Ohio State University*)

PLANT DISEASES

Black Spot of Elm

This elm disease is another of the anthracnose diseases. It occurs each year but is more severe in wet seasons. The causal fungus, *Stegophora ulmea*, can infect in cool spring temperatures as well as warm temperatures of the early summer. All that is required is alternating wet and dry periods. If you will remember, most of Illinois experienced those conditions throughout spring and early summer.

Black spot is a widespread disease in the Midwest, causing black spots and somewhat early leaf drop in most years. This year, due to the ideal weather conditions, infection has been severe. In the Chicago area, many elms have already experienced major defoliation. Despite the defoliation and possibly some injury to the newer shoots, black spot is not known to kill trees. This situation is very similar to the anthracnose of sycamore that we have discussed before. (See issues no. 2 and 4.)

Symptoms of black spot initially appear as yellow spots about 1 mm in diameter. They show on the upper leaf surface as leaves are unfolding from the bud. The spore-bearing acervulus forms in the spot and is eventually surrounded by a black stroma. As these merge, the spots may appear as large as 5 mm in diameter, with a white border. The spots may have splits with white conidial masses evident. These symptoms usually progress from the bottom of the tree toward the top. Sometimes the fruit are affected and develop a crumpled appearance. If infection occurs on the petioles and stem tips, then shoot blight is seen.

There are chemical options for control; but, as with the other anthracnose diseases, these are preventive. Sprays must begin at budbreak and are repeated twice, at 10- to 14-day intervals. Refer to the pest management handbook if you want to consider sprays next year. Sanitation is important with this disease. Rake and remove fallen leaves; and try to prune out any dead wood in the fall. These practices help cut down on fungal inoculum. Also, try to improve tree vigor by watering in periods of drought and fertilizing the tree in the fall. (Nancy Pataky)

Slime Mold Attack

Reports of the slime molds have begun to occur. These growths suddenly appear after heavy rains or after watering in warm, muggy weather—even in gardens of the most avid gardeners. These primitive organisms flow over low-lying objects such as mulches, sidewalks, and vegetation. This process happens relatively rapidly (overnight), but the mold is not going to attack people. These organisms are not parasitic (they do not take nutrients from your plants). Instead, they feed on decaying organic matter and are referred to as saprophytes. During warm, moist weather, the slimy, amoebalike stage flows over low-lying objects and appears as watery white, gray, cream-to-light-yellow, violet, blue, green, or purple-brown greasy masses as large as 1 to 2 feet in diameter. This stage then turns into a colorful, crusty fruiting body filled with masses of dusty spores. Owners usually blame these on their dogs.

For abundant mold, you can break up the unsightly spore masses by vigorous raking, brushing, or hosing down with a stream of water (in dry weather). Mowing the lawn usually removes the spore masses. Chemicals do not provide control. Slime molds disappear with hot, dry weather. For more information about slime molds, read *Report on Plant Diseases* (RPD), no. 401, "Slime Molds in Turfgrasses." (Nancy Pataky)

Cedar-Hawthorn Rust

This disease was discussed in issue no. 5 under "Cedar-Apple and Related Rusts." The hawthorn host is now literally covered with the spores of this fungus. When hawthorn rust is severe, all the foliage turns yellow and may drop from the tree prematurely. Leaves are covered with the orangish spores of the fungus. In parts of Urbana, we have seen sidewalks below infected trees that appear to be painted orange from the heavy spore production on the hawthorns. Infection can also occur on the fruit or stems, causing tissue deformity.

Treatment now is futile. If considering planting hawthorns, look for one of the rust-resistant varieties, such as English hawthorn or Cockspur hawthorn. There may be others available in nurseries. Consult RPD, no. 802, for details on this and other rust diseases. Chemical options are listed on page 68 (hawthorn) and page 71 (juniper) of the *1995 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Pine Wilt Mortalities Increase

We are now seeing death of Scotch, Austrian, and other pines infested with the pinewood nematode, the cause of pine wilt. Issue no. 1 discussed early season symptoms resulting from fall infection. Trees dying now were likely infected in spring or summer.

Watch for flagging (the appearance of dead branches) or sudden decline and death of an entire pine within a few weeks or months of initial symptoms. Scotch pines are most commonly affected in Illinois, and the disease generally affects 15- to 20-year-old trees. Austrian pines are more likely to show flagging and may show only a tip dieback at first (with or without Sphaeropsis tip blight). White pines are not affected by this nematode. Consult issue no. 3 if you have problems with your white pines.

Pine wilt causes the tree to die so quickly that you may wonder why anyone would bother to test for this nematode. The answer concerns disease control. The Sawyer beetle moves the nematode from infected trees to healthy ones. To break the disease cycle, quick removal of an infected tree is important. It is thought that the wood should be burned or buried, not chipped for mulch. An exception would be when the chips can be composted first or dried. No pesticides are known to be effective in the control of this disease. For details on pine wilt, consult RPD, no. 1104. (Nancy Pataky)

Phil Nixon, (217)333-6650, is the executive editor of the Home, Yard and Garden Pest Newsletter. The editor is Mary Overmier, and the typesetter is Oneda VanDyke, both of Information Services.

HOME, YARD & GARDEN PEST

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NEWSLETTER

No. 15 • August 2, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Annual white grubs are still hatching in central and northern Illinois. In central Illinois, sampling done on July 27 yielded first- and second-instar white grub larvae. Insecticide treatments for scouted levels of annual white grubs, Japanese beetle grubs, or combinations of the two of at least 10 to 12 per square foot should begin the last week of July in southern Illinois, the first week of August in central Illinois, and at the end of the first week of August in northern Illinois.

Japanese beetle adults are still numerous throughout Illinois, and egg-laying by this species is probably still occurring. If insecticide treatments are made in early August to control this insect as larvae, some of the longer-lasting insecticides should be used—such as imidacloprid (Merit), isozofos (Triumph), bendiocarb (Turcam), or diazinon—so that they are still present to control late-hatching larvae through August.

Green June beetle adults are flying into people and feeding on soft fruits in southern and central Illinois. Control against the adult beetles is not very practical. Help prevent high adult numbers next year by composting grass clippings and livestock bedding instead of leaving piles that will support larval populations. Reducing thatch in turf may also help reduce beetle numbers in the future.

Fall webworm is still present as first-generation in southern and central Illinois as far north as Lincoln.

Damage may be too extensive and caterpillars may be too old to warrant control at this time. Be ready toward the end of August throughout the state to control young colonies of second-generation fall webworm (first-generation in northern Illinois).

Mike Morrissey, research assistant in Edwardsville, collected an oak twig pruner at Southern Illinois University–Edwardsville. Keep fallen twigs picked up to help reduce long-term numbers of this pest.

Leslie Marsh, urban IPM scout in Champaign, has reported numerous sightings of yellownecked caterpillar eggs on apple, oak, and birch. In some locations, the young reddish larvae have already hatched and started feeding. Walnut caterpillars also should have hatched by now in central and southern Illinois. Walnut caterpillars feed primarily on hickory, pecan, walnut, and butternut. (Tom Royer, John Lloyd, and Phil Nixon)

Japanese Beetle Larval Control

The larval stage of Japanese beetle is one of the white grubs that occur in turfgrass in the fall, eating the roots and causing the turf to turn brown and die. The larvae occur at the same time as the main Illinois turfgrass pest, annual white grub. Even in areas of Illinois where Japanese beetle is common, samples of turf-feeding grubs have revealed a mixture of Japanese beetle and annual white grub larvae.

Because both species of grubs are likely to be present, it is suggested that a chemical insecticide be used for control in the first half of August where the total white grub numbers in the turfgrass root zone are at least 10 to 12 per square foot. Although milky spore disease, *Bacillus popilliae*, is effective in controlling Japanese beetle grubs, it is poor as an annual white grub control, usually killing less than 10 percent of that species.

Milky spore disease is also rather expensive, so it is usually used as an inoculative application. It is applied with the intent that killed grubs one year will produce bacterial spores that will remain in the soil



and kill grubs the following year. Thus, an application usually provides several years of control. In Illinois, Japanese beetle grubs are probably too low in number to produce sufficient overwintering bacterial spores to provide perennial control. Thus milky spore application in Illinois is inundative, as are chemical insecticides; it controls insects at the time of application only. This makes milky spore an expensive means of control if it needs to be applied annually. In addition, garden centers and mail-order catalogs report milky spore as being generally unavailable for the past couple of years.

Controls should be attempted with chemical insecticides if grub populations are at least 10 to 12 per square foot, a population that is high enough to cause turf damage. This number can be determined by slicing down through the turf with a sturdy knife and pulling the turf back to count the grubs. The grubs will be in the root zone of the turf, and their white bodies are easily seen. If raccoon or skunk damage is a problem, those animals will dig up the turf to find grubs even if numbers are as low as 5 per square foot.

Treatment of Japanese beetle grubs to reduce the number of adult beetles the following year is not a fruitful activity. The actions of nature (including hot and cold temperatures, dry and wet conditions, and insect diseases) kill tremendously more grubs each year than all the insecticides applied. In addition, adult Japanese beetles are strong fliers and will fly to ornamental plants from other locales. If one considers the amount of turf within a 1/2-mile radius, and that three to five beetles are likely to emerge from each square foot of that turf, it is easy to see that treating the turf in a lawn to reduce beetle numbers is going to make little difference. (*Phil Nixon*)

Fleas

Fleas are common on dogs and cats throughout Illinois this summer. Although there are more than 2,000 species of fleas, the main flea found on both dogs and cats in the United States is the cat flea. Adult cat fleas are small insects (about 1/16 inch long) and are dark brown to black in color. They are wingless and flattened from side to side. Adult cat fleas live on the host and feed exclusively on blood. Female cat fleas are especially ravenous blood feeders and may consume 15 times their body weight in blood daily. Fleas excrete large quantities of incompletely digested blood, which dries quickly into reddish-black fecal pellets, or coils, known as flea dirt. Flea feces found on the pet, especially at the base of the tail, is diagnostic for the presence of fleas.

Female fleas can lay up to 50 eggs a day. The eggs are laid on the pet; but, because they are not sticky, they fall off the pet. Eggs are thus deposited in locations where the pet has been. Most of the eggs hatch into larvae within 2 to 5 days, depending on the temperature and humidity. The larvae are slender, legless, and almost 1/4-inch long when fully grown. They feed on organic debris in the environment and on adult flea feces, which are essential for their development. Larval fleas are very susceptible to drying and heat, and they are repelled by light. Indoors, they will probably survive only in protected areas, such as cracks between hardwood floors and at the base of the carpet pile. Outdoors, flea larvae are most likely to develop in moist, shaded areas where the pet spends a lot of time. Larvae complete their development in about 7 to 10 days and then produce silklake cocoons, in which they pupate.

The pupal stage lasts about 7 to 10 days, and then the flea molts to a pre-emerged adult flea that resides in the cocoon. This stage is extremely resistant to insecticides and is much more resistant to drying than the eggs or larvae. Due to this insecticide resistance, fleas may continue to emerge from cocoons for up to 4 weeks after insecticide is applied to the environment. The pre-emerged adult can remain in the cocoon for up to 140 days if it does not receive the proper stimulus to emerge.

The pre-emerged adult remains within the cocoon until direct pressure on the cocoon, increased temperatures, and increased carbon-dioxide levels in the environment stimulate the adult flea to emerge. Once emerged, the flea almost immediately seeks a host. The adult flea must feed within 1 to 14 days, or it will die. In most households in the Midwest, the entire life cycle of the cat flea is completed in 21 to 28 days.

Controlling fleas on pets can be very frustrating, time-consuming, and expensive. It is best to recognize a problem early before the fleas get out of hand. It is also important to remember that a flea problem will not go away overnight, and it may take several weeks of hard work to get things under control. Any comprehensive flea-control program includes treating not only all pets in the household but their environment as well.

Treating the pet's environment should begin with mechanical control measures. Indoors, a pet's bedding and throw rugs should be washed at least once a week. A schedule of regular vacuuming (every other day) during hot and humid weather can reduce the number of fleas indoors. Vacuuming is helpful in a variety of ways. It helps remove flea eggs, larvae, and

the flea dirt necessary for larval development. Vacuuming can also vertically straighten the carpet pile and un-mat the fibers to increase penetration and effectiveness of the insecticide applied to the carpet. In addition, vacuuming can stimulate pre-emerged adult fleas to emerge from cocoons and climb to the top of the carpet, where they are susceptible to insecticide applications. The vacuum cleaner bags should be discarded after use.

Besides the carpet, sofas and chairs should also be vacuumed. It is particularly important to vacuum crevices in sofas and chairs, where flea eggs and larvae can accumulate.

After vacuuming, each room should be treated using a hand-sprayer, aerosol, or fogger containing an insecticide that kills adult fleas, as well as an insect growth regulator (IGR). IGRs are compounds that break the life cycle of the flea by inhibiting development of immature stages of insects. In many aerosols sold in garden centers and hardware stores, these IGRs are available with insecticides to kill the adult fleas. Look for products that have methoprene or Precor in the ingredient statement. The brand names will usually include wording such as "7-Month Flea Spray," "210-Day Carpet Spray," "Flea Killer 210," or "Total Flea Killer." After the carpet dries from the insecticide application, vacuum again to remove any fleas that were stimulated to emerge.

Outdoors, remove organic debris in moist, shaded areas, where flea development is most likely to occur. Spray these areas with an insecticide that contains an IGR. It is not necessary to treat areas of the yard that are exposed to sunlight.

There are numerous products available for use on pet animals. Shampoo, powder, spray, dip, mousse, pour-on, and oral formulations, as well as collars, are all available. Each has its own advantages and disadvantages. Discuss with your veterinarian which product(s) would be best for you to use.

A new once-a-month tablet called Program for flea prevention and control has become available through veterinarians. The compound does not affect adult fleas but inhibits development of the immature stages. Hopefully, this will be an additional useful tool in the battle against fleas. (*Allan Paul, veterinary Extension, and Phil Nixon*)

Scouting for Insects

We often use the words "scouting" and "monitoring" when we talk about Integrated Pest Management (IPM) and plant health care for landscape plants.

What do the words actually mean? Don't they just mean looking for pests and pest damage? Not necessarily. Looking is a part of scouting but not the entire process. To monitor or scout for insects, as our new undergraduate scouts have discovered, is not just the process of looking, but the process of observing, recognizing, identifying, estimating, and recording.

Observing, recognizing, and identifying pests are undoubtedly the most important aspects of scouting. Inherent in these facets of scouting is the ability to identify plant materials. Many of the insects and their damage can be determined from knowing the host plants. Training and experience in insect identification and biology are necessary to recognize the damage symptoms, ascertain if the pest is present, and determine if management is necessary. Tools such as passive and attractant traps can be used to assist in observing some insects. Scouts should be able to discern between pest insects and beneficial insects. No one, not even a Ph.D. in entomology, can memorize all the insects associated with trees and shrubs. However, a basic knowledge of feeding habits and the resulting feeding damage will go a long way in helping to determine if management is warranted.

Estimations of insect pest populations, and their potential for damage to the host plant, can be obtained from initial scouting observations and identifications. Suggestions on ways to quickly estimate insect populations will be the subject of an article in a later issue of this newsletter. Proper identification is essential for estimating an insect's impact on a plant. For example, aphid populations can increase rapidly; however, the majority of aphid species do little damage to the health of the plants. The aphids that do cause damage are relatively species specific (that is, they are associated with only one host plant). Knowing the host plant can help determine whether the aphids will cause significant injury. A large portion of the insect pests that attack ornamental plants are specific to a host plant; and, conversely, there are specific plants that tend to be more susceptible to certain insects. By recognizing the susceptible hosts and determining the predominant insect pests, the scouting routine becomes more efficient. This concept is often referred to as the "key plant" and "key pest" concept.

In many landscape situations, the estimation of insect populations isn't inferred by the impact on tree health but rather by the effects on plant appearance and the surrounding landscape. The aphid populations mentioned above may do no harm to the tree, but the honeydew they excrete may cause concern for people

sitting at a picnic table under the tree. This insect impact on the "aesthetic" value of plants varies according to the host plant, landscape environment, and the individual who owns the tree. If the tree is located in a portion of the landscape where there is little human contact, no management may be necessary; however, in the picnic situation, management may be warranted. Scouting includes taking these aesthetic variables into account when estimating potential insect damage.

Most situations involving insect impacts on the aesthetic value of plant materials are not clear cut. Estimations dealing with these factors vary widely from plant to plant, person to person, and environment to environment. Current research-based aesthetic thresholds are available for relatively few ornamental insect pests and tend to be time-consuming to calculate. When other variables, such as the populations of beneficial insects (natural enemies) of the pest insects, are thrown into the mix with aesthetic values, the picture becomes even more cloudy. Through experience and education, scouts can make better-informed estimations of whether or not management is warranted.

Recordkeeping is the last, but not the least important, part of monitoring and scouting. By keeping records, scouts can help identify "key plants" and "key pests." Recording trends in pestiferous and beneficial insect populations can assist in making management decisions. Many computer programs are available that can help landscape managers track plant conditions and pest problems from data supplied from scouting reports. Whether or not a computer is used, records of pest problems can be kept and compared to previous reports to establish management criteria.
(John Lloyd)

PLANT DISEASES

Powdery Mildew

This fungus is fairly easy to identify in the field, and early detection may prompt fungicide controls in cases for which the disease is a regular deterrent to growth. We have seen this disease since early July.

The powdery mildew diseases affect woody and herbaceous ornamentals, as well as vegetable, cereal, and fruit crops. These fungal diseases are easy to identify, due to the characteristic white-to-light-gray, powdery growth, which is found primarily on the leaves. Because these fungi flourish when the days are

warm to hot, nights are cool, and dew forms on foliage, there should be plenty of this disease around. The recent hot nights are probably going to slow development. Disease development, however, will be most severe on crowded plants in shaded locations or where air circulation is poor.

This year we have seen very severe infection of mildew on sycamores. Weather conditions in the central part of the state were perfect for the fungus, and there was an abundance of lush new growth because the trees were recovering from the extensive defoliation of earlier anthracnose problems. Sycamores are tough trees and should probably continue to grow and become infected with anthracnose and mildew for years to come.

After the initial symptom of a white, powdery growth, powdery mildew may cause stunting, curling of leaves, chlorosis, premature leaf drop, and deformation of flower buds. In most ornamental plantings, the damage is primarily aesthetic. An example is lilac, as shown on picture sheet "Woody Ornamental Diseases I." With fruit crops such as apple, however, there may be twig damage, fruit loss, or loss of fruit quality.

Unlike most fungal diseases, powdery mildew is not as destructive when rains are frequent. High relative humidity (but not rain) is needed for spores to germinate, and mildew develops rapidly in extended periods of warm, dry weather when morning dews are heavy. Ideal disease conditions are 90 to 99 percent relative humidity at temperatures of 66° to 72°F.

Whenever possible, look for cultivars resistant to mildew. Pruning diseased wood (especially on rose and crabapple) during the normal pruning period greatly reduces overwintering inoculum. Try to prune plants to allow better air circulation, and never handle infected plants when they are wet. As usual, plants should be maintained in high vigor to withstand disease attack.

Fungicides can control powdery mildew fungi in a preventive mode of action. Sprays must be initiated when the disease first appears, usually in early July. Consult the *1995 Illinois Urban Pest Management Handbook* for chemical options and *Report on Plant Diseases (RPD)*, no. 617, for details on the powdery mildews and their control. As a last note, if you see mildew on dogwood, we would like to see a positive case at the Plant Clinic. If you have dogwood powdery mildew, send your sample to the Plant Clinic at no charge. Be certain to label it as Nancy Pataky's request so that it is not billed. (Nancy Pataky)

Rose Cane Cankers

Three canker diseases (brown canker, stem or common canker, and brand canker) are common in Illinois and are generally confused with winter injury or other problems. Cane infections may approach 100 percent where control measures are not practiced. The first symptoms are small, roundish lesions in the canes; the spots are pale yellow, reddish, or bluish purple. They gradually enlarge, turn brown or grayish white (often with a darker margin), and may partially or completely girdle the cane. Complete girdling results in dieback or poor growth of the plant parts above the affected areas. Cankered areas are sprinkled with black, speck-sized, fungus-fruited bodies. When left unchecked, infections may spread downward into the crown, causing entire rose plants to wilt, wither, and die. Infection occurs chiefly through a wide variety of wounds, including thorn abrasions. Infections may also occur on the leaves and flowers.

Good sanitation is critical to control these diseases. Prune the canes in fall and in early spring, according to the type and cultivar grown. Remove and burn or haul away with the trash all infected, dead, and weak parts of canes, as well as infected leaves, flowers, buds, and hips. When pruning cankerous stems, cut back to a strongly growing shoot or branch at least 2 to 3 inches below any sign of infection. Before each cut, dip the shears in a disinfectant, such as 10 percent Clorox or 70 percent rubbing alcohol. Use sharp tools to make clean, slanting pruning cuts no more than 1/4 inch above a node.

Plant only top-quality, disease-free plants from a reputable nursery. The plants should be free of cane bruises or colored spots. Bargain roses are often infected. Maintain plants in high vigor by proper planting, spacing, fertilizing, watering, winter protection, and thorough spraying with fungicides. Start as the buds break open in the spring, and continue at 7- to 10-day intervals into September or early October. The fungicides that control black spot usually control cankers as well, so no additional spraying is required. Adding a spreader-sticker material to the spray, however, helps wet the canes for better protection.

Malcolm Shurtleff, retired Extension specialist in plant pathology, suggests using a dormant spray of lime-sulfur applied to canes and surrounding soil just before adding the winter protection and again just before budbreak in the spring to control cankers and a wide range of other diseases. Consult *RPD*, no. 626, and the *1995 Illinois Urban Pest Management Handbook* for details concerning this disease and control. (Nancy Pataky)

Tomato Wilt Diseases

The Plant Clinic has recently received several tomato samples, along with questions concerning the wilt diseases. Wilts can be caused by several agents. Three common vascular wilts of tomato are caused by pathogens (infectious agents). Walnut wilt produces similar symptoms, including a brown discoloration of internal wood tissue, but it is caused by a toxin produced by walnut roots. Some viruses, flooding or rotting of roots, and even some herbicide injury can also cause wilting of tomatoes.

The more common vascular wilts of tomato include several bacteria and two fungi, *Fusarium oxysporum* and *Verticillium dahliae*. The symptoms of *Fusarium* wilt and *Verticillium* wilt are similar. Infected plants may be somewhat stunted, and leaves turn yellow and die, often starting from the base of the plant and progressing upward. Leaves on one side of the plant may show symptoms, while leaves on the other side appear normal. Wilting may occur at or during the hottest part of the day or when the plants are stressed from dryness or a heavy fruit load. Infected leaves may dry up before wilting is detected. Both diseases cause discoloration of the vascular (woody) tissue. With *Fusarium* wilt, the vascular tissue of stems and petioles becomes brown to reddish brown, while only the lower stem tissues take on a grayish color with *Verticillium* wilt. Laboratory isolation is required to distinguish these two pathogens positively. Both fungi are soil-borne and infect the plants through the root system; both are able to survive in soils in the absence of a susceptible tomato plant for many years. *Fusarium* can also be seedborne.

Bacterial wilt is caused by *Pseudomonas solanacearum* and affects potatoes, eggplants, and peppers, as well as tomato. With bacterial wilt, the plant suddenly wilts without leaves yellowing. The center of stems is water-soaked at first, later turns brown, and may even become hollow.

Disease resistance is the most common way to control the fungal diseases. Tomato varieties marked "VFN" have resistance to *Verticillium*, one or more races of *Fusarium*, and nematodes. Short-term crop rotations do little to control these diseases, but long-term crop rotation (of 5 to 7 years) can help reduce the incidence of *Verticillium* wilt. Removing infected plant parts, including roots, may help reduce the buildup of inoculum. Using nitrate forms of nitrogen can help reduce the severity of *Fusarium* wilt, while ammonium forms promote disease development. Because low soil pH also favors *Fusarium*, increasing

soil pH to a range between 6 and 7 can help control Fusarium wilt; don't raise it above 7.5, however, as this favors the development of Verticillium wilt. For more information, read *RPD*, no. 729, "Fusarium Wilt or 'Yellows' of Tomato," and no. 1010, "Verticillium Wilt Diseases." (*Nancy Pataky*)

Oak Wilt Update

This disease was discussed in issue no. 13, but the Plant Clinic has continued to receive samples that have tested positive for the causal fungus. To date, we have confirmed positive cases of oak wilt in the following counties: Adams, Champaign, Cook, DeWitt, and Schuyler. (*Nancy Pataky*)

HORTICULTURE

Diagnosing Herbicide Injury

In issue no. 13, we discussed injury symptoms of the more common herbicide that result in drift problems. A thorough knowledge of herbicide mode of action is necessary in diagnosing herbicide injury.

Clues to look for. If herbicide injury is suspected, look for several clues. What is the plant, its growing condition, and age? When was injury first seen, what does it look like, and does it have a specific pattern? What type of herbicide was applied, when, and at what rate? Were other chemicals, including fertilizers, applied recently? Get weather and soil information.

Injury from herbicides generally appears within 1 to 2 days after exposure, but symptoms may develop up to several weeks later. In the case of tree roots growing into sites treated with a soil sterilant, injury can occur up to 2 years later. Look at adjacent plants for similar symptoms because it is unlikely that herbicide drift injury will occur on just one tree or shrub in a landscape.

Recovery. Unfortunately, once injury symptoms are present, there is little you can do. Keep the plants as healthy as possible through proper watering and fertilization. If drift contacts nontarget plants, wash them immediately with fresh water from a hose or clean sprayer. You can apply activated charcoal to the soil to tie up certain root-active herbicides. When edible crops have received herbicide drift, the safety of eating them is questionable.

Wait and see. The majority of herbicide-injured plants outgrow the injury. Determining factors include the general vigor of the affected plant, the amount of herbicide it received, and the type of herbicides used. Healthy woody plants that receive a low dose of a growth-regulator herbicide most likely will recover, but a greater dose may persist within the woody plants, causing injury symptoms for the next two or three seasons. Plants that have absorbed a soil sterilant may not recover.

Preventing future injury. To avoid herbicide injury in the future, always read herbicide labels carefully for information on how to avoid nontarget injury. Use all precautions to avoid drift, including spraying only during appropriate weather conditions, using low-pressure, large nozzles, and drift-control agents if necessary. For products that volatilize easily, such as 2,4-D formulated as an ester, amine formulations are less likely to vaporize and drift off-target.

Although herbicides are an important tool, they must be respected and used properly. Drift and other types of misapplication unnecessarily disrupt our ecosystem and injure nontarget plants. Remember that all pesticide labels explicitly prohibit drift from occurring. Because the label is a legal document, any application that violates the label can result in civil and criminal penalties to the applicator. (*Rhonda J. Ferree*)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report: July 31–August 4

Japanese beetle adults continue to be numerous in areas of the state where the beetle has spread or been introduced. Control against feeding beetles may not only be needed, but turf areas should be checked for damaging levels of grubs, which should have hatched.

Green June beetle adults are being found throughout the southern two-thirds of Illinois. These heavy-bodied beetles are about 1-inch long and green, with a yellow stripe on each side. They fly into people and objects during the day. They lay eggs into piles of grass clippings, manure piles, and turf thatch. Prevent the larvae by composting grass clippings and manure.

Yellownecked caterpillars are in the black phase, which indicates they are about ready to pupate in central Illinois. Damage by the caterpillars to host plant materials is nearing the end. Late-season defoliation does not readily affect plant health, so treatments at this time would serve only as revenge.

Honeylocust spider mites have been attacking newly planted honey locust in the Champaign-Urbana area. With the recent damp weather, it is unlikely we will notice further warm-season spider-mite damage on deciduous ornamentals. The treatments for warm-season spider mites were described in issue no. 14.

Locust leafminer damage is obvious on black locust trees in southern Illinois. In many cases, most

of the foliage on the trees is brown. The majority of the damage by the larvae of the beetles has occurred already, so control is not warranted. For more information on locust leafminer, see issue no. 9. (John Lloyd, Phil Nixon, and Tom Royer)

Fall Webworm

The first generation of fall webworm is still active in central Illinois, and we are starting to notice second-generation larvae in southern Illinois. Fall webworm has only one generation in most of the northern half of Illinois; but Illinois, from about Lincoln south, has two generations per year. The second generation will begin to appear in central Illinois in late August. At this same time, the only generation of fall webworm in northern Illinois will begin to appear.

Eggs are laid in clusters on the underside of tree leaves by white moths with 1-1/2-inch wingspans. The eggs hatch into hairy, yellowish larvae or caterpillars. They have red or black heads and black spots, depending on the race. This insect is usually identified by the silk tent that the larvae spin around the leaves they are feeding on. As the larvae eat the leaves, they enlarge the tent every few days. Large tents associated with older caterpillars in large colonies may be 2 to 3 feet long, enclosing many leaves. When fully grown, the larvae drop to the ground to pupate and emerge as moths for the second generation.

Fall webworm feeds primarily on crabapple, hickory, walnut, pecan, and maple. The first generation seems to prefer slippery elm, mulberry, sweet gum, red bud, and crabapple. Fall webworms can be found on many other trees and shrubs. More than 200 species of deciduous trees and shrubs are recorded as host plants of this caterpillar.

Control can be achieved by pruning off and destroying the silk tent holding the caterpillars. Because caterpillars remain in the tent day and night, this mechanical control is effective if the tent is within

reach and still small. *Bacillus thuringiensis kurstaki* (Dipel or Thuricide) is also effective, as are several other chemical insecticides listed in the 1995 *Illinois Urban Pest Management Handbook*. Use sufficient spray pressure with an insecticide to penetrate the silk tent and treat the leaves within. Otherwise, the spray may break down before the larvae enlarge the tent and contact the treated foliage. (Phil Nixon)

Annual White Grubs

Annual white grubs are present as second-instar larvae in central Illinois as of August 2. No first-instar larvae were found, indicating that egg hatch is complete in southern and central Illinois. Larvae should all be hatched in northern Illinois by the week of August 7.

Annual white grub larvae are C-shaped, elongate, and white, with brown heads and three pairs of legs. Second-instar white grubs are 3/8- to 1/2-inch long; so, although they are small, they can be easily seen. First-instar grubs are smaller, about 3/16-inch long and slender, so they can be more easily missed. The grubs will soon be the even larger third-instar larvae, where they will stay until they pupate late next spring.

Scout for annual white grubs by cutting the turf with a sturdy knife and pulling it back. The turf will separate from the soil in the root-zone area, where the grubs feed. With their white color, the grubs should be easily seen against the dark soil. Check the uncovered soil and the soil hanging to the roots of the pulled-back turf. Gently till the soil with the knife blade to uncover additional grubs. If the soil is dry, the grubs may be as much as 3 inches deeper in the soil, so probe more vigorously. Replace the turf as soon as possible; tamp it into place with your hand or foot.

Annual white grubs are more numerous in exposed turf that has been well watered or is warmer than the surrounding turf. Adult beetles burrow into the soil to lay eggs and are attracted to the softer, irrigated turf in summers like this one, when unirrigated turf was dormant and the soil was dry and hard during the first half of July, when eggs were being laid. Even in watered turf, areas receiving extra water will have more grubs and should be sampled. Areas getting extra water include turf alongside watered flower and vegetable gardens and front lawns (which typically are irrigated more than backyards). The adult beetles are also attracted in egg-laying to warm turf alongside paved areas such as sidewalks, streets, and driveways. Adult beetles do not lay eggs under tree canopies, so tree-shaded areas should be avoided when scouting.

At least 10 to 12 annual white grubs per square foot are likely to cause enough root-feeding damage to

result in the brown, loosely rooted turf associated with white grub damage. Highly irrigated areas can sustain higher numbers of grubs without obvious damage than can unwatered areas. Highly used areas (such as athletic fields, golf courses, and lawns) are likely to show damage with grub numbers under 10 per square foot. Raccoons and skunks may cause damage by digging up the grubs to eat when the numbers are as low as 5 per square foot.

Where damaging levels of white grubs are found, labeled insecticides should be applied at labeled rates for control. Bendiocarb (Turcam), diazinon, isozofos (Triumph), or trichlorfon (Dylox or Proxol) should provide effective control. Diazinon cannot be used on golf courses and sod farms. Triumph is labeled for use only on home lawns, sod farms, and golf-course tees, greens, and aprons. If the insecticide is applied as a liquid, it should be watered in with at least 1/2 inch of water within 30 minutes after application, before the insecticide dries on the grass blades and thatch. In areas without in-ground irrigation, granular formulations should be used so that more time is available to apply the 1/2 inch of water. Turf damage should not occur before mid-August in southern Illinois, the third week of August in central Illinois, and late August in northern Illinois. (Phil Nixon)

Asian Multicolored Lady Beetles

Asian multicolored lady beetle is the lady beetle that entered houses and other buildings in large numbers last fall and stayed the winter in window sills, baseboards, and other cracks and crevices. We appear to be set for large numbers again this year, based on the number of larvae, pupae, and adults present on trees.

This lady beetle is about 1/4 inch in diameter, roundish, and dome-shaped. The color of the wing covers varies from yellowish to orange to reddish, with a deep orange being most common. The adult has 19 black spots on the back. Most individuals have large, easily seen spots; but some have very tiny or no spots. In front of the wing covers is a pattern of white spots on a black background.

The soft-bodied larvae are common on plants where the adults are found. Adults are elongate, sit close against the leaf surface, and have six legs that sprawl out to the sides, making them look like tiny alligators. When fully grown, they are about 3/8-inch long and black; the middle third of the body is orange, with a wide black stripe down the middle. A whitish stripe runs down the middle of the back from the head to the orange area.

Fully grown larvae pupate on the leaves. A larvae

that is ready to pupate attaches its posterior end to the leaf and raises the rest of the body when disturbed. Pupae are about 1/4-inch long and orange, with or without black spots. Adult beetles emerge from the pupae when fully developed.

The larvae feed voraciously on aphids and scale insects. They even feed on the pupae of their own species. The adult beetles also feed on aphids and other soft-bodied insects. On some plants, they are very common—more numerous than other lady-beetle larvae, pupae, and adults noticed in the past. With these large numbers, fall migrations to buildings are likely to be as heavy as, if not heavier than, last year.

As with any beneficial insect, regardless of numbers, control is not recommended. These insects are doing a good job controlling harmful insects and should not be disturbed. (*Phil Nixon*)

Those \$%#&! Deer

We planted more than 100 paper birch seedlings in three locations in Illinois this spring. We were hoping they would grow up to be fodder for bronze birch borers, but the native mammals had other plans. To date, only one planting hasn't exhibited symptoms of nibbling and chewing by rabbits and deer.

Trying to protect the young plants from these critters has been tough for this Wyoming cowboy. The weapons we're using in this war are physical fencing and repellents. I read in the current *Illinois Fruit and Vegetable News* that some fruit growers have placed invisible fencing around the orchards and put dogs with sensitive collars inside the fence to keep the deer out. Maybe we could develop similar collars for deer in urban areas to keep them out of new plantings. (Whoa, I feel a grant proposal coming on.)

The battle has just begun, but the furry megafauna seem to have the lead. We have a half-dozen tree mortalities as of this writing, but the war will wage on. We will keep you updated on our successes and failures. (*John Lloyd*)

PLANT DISEASES

Rose Rosette Disease

If any leaves are left on your roses after the Japanese beetles are finished, rose rosette disease may be evident. Actually, the symptoms are quite distinct and difficult to miss, even with insect injury. New growth appears deep red, both on leaves and stems. Leaves may show crinkling, distortion, or a mosaic of green, yellow, and red. An infected plant produces numerous

lateral shoots that grow in different directions, giving the plant a witches'-broom appearance. These shoots are typically deep red and much larger in diameter than the canes from which they grow. Their thorns are more numerous than normal. Plants usually die within about 22 months of infection.

Rose rosette is believed to be caused by a double-stranded RNA, making it a viruslike disease. It cannot be cultured in the lab, and most labs depend on symptom expression for diagnosis. The vector is an eriophyid mite so small that 20 could fit on a pinhead. The disease also can be spread by grafting.

Multiflora rose is the most common host, but rose rosette has been reported on cultivated flowering varieties. Climbers, hybrid teas, floribundas, miniaturs, and a number of "old-fashioned" roses have been infected. Hybrid teas typically show a color more yellow than red. The Plant Clinic has received a few samples over the last 2 years, but the number has not been alarming.

At present, there is no practical control for this disease. Diagnosis is important because plants with symptoms should be dug up and destroyed (including roots) when first noted. It is strongly suggested that multiflora and garden roses be separated as far apart as possible. The efficacy of mite control has been questioned. If miticides are used, research suggests that the critical mite transmission time is May and June, so concentrate your efforts in those months.

For more information on rose rosette disease, consult *Report on Plant Diseases (RPD)*, no. 666. (*Nancy Pataky*)

Burning Bush (*Euonymus*) Decline

The Plant Clinic has received a number of samples and calls concerning the rapid decline of burning bush plants. The problem appears to be more with the upright *Euonymus alatus* rather than the ground cover forms of *Euonymus*. The samples have been examined for possible fungal canker problems, crown gall at the base of plants, root injury, and the like; but infectious problems do not appear to be at fault.

Horticulture specialist Dave Williams states that this species is intolerant of drought conditions, which the samples received often have been associated with. Dr. Dirr, in *Manual of Woody Landscape Plants*, states that this plant also is not tolerant of waterlogged soils. This fact suggests that either extreme in water availability could be a problem, and in some parts of the state both conditions may have been present this year. The problem, then, may be root stress or root injury caused by moisture and temperature stress.

These are not factors we can prove. We cannot find an infectious cause, and the problem is widespread over a great geographical area, so the most logical cause is environmental stress. (*Nancy Pataky*)

Sclerotinia White Mold

While those of us on campus are still concerned about drought, others have received plenty of water this summer. Sclerotinia white mold has been reported by Martha Smith at the Macomb Center; she has seen it on some herbaceous ornamentals in the last week or two.

The disease began a comeback in July 1992, when rains were abundant; it has been maintained since by the same conditions. (We are not seeing it in Champaign.) Sclerotinia is common on tomato, green bean, pepper, and soybeans as well as on ornamental crops such as begonia, daisy, delphinium, hydrangea, marigold, pansy, and zinnia. Many of you have the 600 series of *Reports on Plant Diseases*. This disease is listed in the 1100 "catch-all" series and is available as RPD, no. 1008.

White mold, a disease of cool, wet weather, is caused by the fungus *Sclerotinia*. Due to recent rains in the affected areas and cool temperatures (though temporary), the fungus has sporulated and infected the stems. The fungus remains in resting spores (sclerotia) in or on the soil. With ideal weather conditions, apothecia (fungal fruiting bodies) form and spores are released into the air. A period of wet weather then is required for infection to occur. The alternating wet and dry periods experienced in some parts of the state have been ideal for this disease.

Symptoms are easy to identify. Look for bleached areas on the stems and at leaf axils. They appear almost like animal bones dried in the sun. In cool, wet weather, a white fluffy mold develops on the stem. In 7 to 10 days, sclerotia form inside the stem. They are large black structures, almost like rabbit droppings; they are usually found inside stems but may also form on the outside of stems of some species.

Control options are limited. The home grower can try to keep plant density low so air movement helps plants dry out sooner. There are no rescue treatments for commercial growers. Fungicide applications may help on a preventive basis in areas where this is a problem every year. For chemical options, consult the *1995 Illinois Urban Pest Management Handbook*. (*Nancy Pataky*)

Gummy Stem Blight of Cucurbits

Gummy stem blight occurs on all cucurbits, including cucumber, muskmelon, and watermelon. On squash

and pumpkin, the disease caused by the same fungus is called black rot. Plants die quickly if infected in the seedling stage. On older plants, all aboveground parts can be affected. Leaf symptoms appear as tan, circular-to-irregular lesions and often begin at the leaf margins. Lesions can expand toward the center of the leaf, causing large areas to become blighted. Small black fruiting bodies, pycnidia and perithecia, usually develop on the necrotic tissue. Infection of the stem causes cankers or lesions that are initially oily green and later turn tan. These lesions may exude sap, which dries to form drops of resin-colored gum (thus the name). Lesions can expand to girdle the stem, causing wilt and dieback of entire vines or plants. Fruit symptoms vary on different crops but usually start as small, watersoaked, circular spots. With age, these spots usually darken, and gummy exudate and fruiting bodies may develop in the spots. The fungal pathogen overwinters in infected crop debris and can be carried on infected seed. The disease is favored by rainy weather and moderate temperatures. Pruning, picking, and insect wounds can be infection sites, especially on older stems and leaves.

Vegetable pathologist Darin Eastburn has seen the disease this year, especially in areas with frequent rains. He recommends crop rotation schedules of 2 to 3 years, planting only disease-free seed, and good sanitation practices (removing infected plant debris) as the best means for control. Protecting plants with fungicide treatments may be necessary, especially when plants are young. Weekly sprays are recommended, starting when vines begin to run. For most growers, it is too late to use fungicides this year. For commercial growers, Bravo, Benlate, Topsin M, mancozeb, and maneb are registered. (*Nancy Pataky*)

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NEWSLETTER

No. 17 • August 16, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Blossom-End Rot and Sunscald

Maturing tomato fruit sometimes develops large necrotic (dead) areas on the surface. The two most common causes of these lesions are blossom-end rot and sunscald. Pepper, summer squash, and other cucurbit crops may also experience this problem.

As the name suggests, blossom-end rot develops as a necrotic area at the blossom end of the fruit, the end farthest from the stem. On tomatoes, the tips of the fruit often turn dark brown to black in color, while the ends on peppers usually become light brown or tan. Blossom-end rot results from a calcium deficiency in the plant, caused by large fluctuations in soil moisture. When soil moisture is limited, plant growth slows, and nutrient uptake by the roots is reduced. If water becomes available again, from rain or irrigation, the plant begins to grow rapidly, but the uptake of calcium lags behind. Thus, the rapidly expanding fruit tip does not have enough calcium available to develop properly, even though there is plenty of calcium in the soil.

Foliar applications of a calcium-rich fertilizer to control blossom-end rot have mixed reviews. Some studies indicate that some control is achieved, while others report little or no reduction in the disease. The best method for controlling blossom-end rot is to maintain even and adequate levels of soil moisture. With soil that becomes neither too dry nor too wet, the plant grows at an even rate, and the nutrients stay

in balance. Growers may have problems keeping even soil moisture this season.

Sunscald is the other problem causing large necrotic areas on tomato and pepper fruit. Sunscald develops when an area on the fruit surface becomes too hot from being exposed to the sun. On tomatoes and some peppers, therefore, sunscald often develops on the sides or "shoulders" of the fruit, near the stem end. Sunscald often develops on fruit formed in the shade of the plant canopy and then suddenly exposed to direct sunlight. Sunscald often occurs when plants lose leaves from foliar diseases. On tomato, early blight and Septoria leaf blight can cause premature defoliation, which leads to sunscald. On pepper, the same thing occurs when plants infected with bacterial spot drop their leaves. Vascular wilt diseases and bacterial canker can also cause defoliation and, thus, lead to sunscald.

Avoid sunscald by controlling diseases that may cause premature defoliation. Grow tomato varieties that are resistant to Verticillium and Fusarium wilts (VFN tomatoes). Plant pepper varieties producing fruit that hang down and are covered by the foliage. Minimize plant breakage during harvesting to avoid suddenly exposing the fruit to sunlight.

If you are seeing a lack of tomato or pepper fruit, this is not related to blossom-end rot. Hot nights and hot winds often prevent pollination from occurring. (Nancy Pataky)

Aster Yellows of Flowers

This disease can affect many species, particularly chrysanthemum, aster, daisy, marigold, and petunia. The affected plants are yellowish, stunted, stiff, erect, and bushy. Flowers may be deformed, with partially or totally green, leafy petals.

Aster yellows is caused by a mycoplasma (a pathogen intermediate between a virus and a bacterium) and is transmitted by leafhoppers. Control measures include destroying all affected plants when they are first seen, eliminating all broadleaf weeds,



and buying disease-free plants. Spraying regularly to keep leafhoppers from feeding may be beneficial. Frequent insecticide applications are necessary. Laboratory diagnosis is generally not helpful because mycoplasmas cannot be isolated from plant tissue in most labs. For more information, read *Report on Plant Diseases (RPD)*, no. 903, "Aster Yellows." (Nancy Pataky)

Virus Diseases of Brambles

Virus diseases reduce the yield and fruit quality of bramble fruits more than they do for any other fruit crop. Once infected, brambles remain so for life. The viruses are spread by the feeding of aphids, but not by pruning or other mechanical injuries. Because viruses cannot be cultured, extracted, or induced to sporulate, symptoms are very important to a correct diagnosis. Infected plants commonly decline in vigor. The leaves may be yellowish, light to dark green, mottled, blistered or puckered, dwarfed, curled, wrinkled, and cupped downward with the mosaic types. The leaf curl viruses generally cause slight stunting and "bushy" growth with small, dark green, bunchy, stiff, tightly curled leaves.

You cannot kill or inhibit virus particles with sprays. Control involves destroying all infected cultivated and wild brambles within 1,000 feet, if possible. Start new plantings with certified, virus-free plants. If growing both black and red raspberries, separate them by at least 150 feet to reduce virus cross-infection. Maintain strict aphid control at all times. Follow recommendations of the University of Illinois Extension entomologists. For more information, read *RPD*, no. 710, "Virus Diseases of Brambles." (Nancy Pataky)

INSECTS

Scouting Report

Annual white grubs are treatable throughout Illinois. Populations of 10 to 12 per square foot are likely to cause damage. In some areas of central Illinois, populations of 60 to 100 are being found, much more than the 20 to 30 found in high-population areas in most years.

Billbug larvae are present, feeding on turfgrass roots in central Illinois, but have been found only in low numbers. Treatments for annual white grub also control billbugs in this stage.

Elm leaf beetles are pupating in southern Illinois and soon will be doing the same in central Illinois. Insecticide applications save so little leaf-feeding damage at this time that they are not justified in most situations.

Residents in Springfield reported finding green, 2- to 3-inch long sausages feeding on their trees. The plump creatures are actually larvae of the cecropia moth, which feed on over 50 species of plants. *Bacillus thuringiensis* var. *kurstaki* (Dipel or Thuricide) or any of the insecticides listed for caterpillar control in the *1995 Urban Pest Management Handbook* will control the larvae in severe infestations.

Sycamore tussock moth larvae have been reported as well in southern Illinois. The larvae, which are covered with yellowish hair, have two long white hair tufts, or pencils, protruding from the front and also the back. They defoliate American sycamore and London plane trees. They can be controlled, if numerous, with an application of *Bacillus thuringiensis* var. *kurstaki* (Dipel or Thuricide), carbaryl (Sevin), or several other insecticides. (Tom Royer, John Lloyd, and Phil Nixon)

Walnut Caterpillar

The walnut caterpillar is closely related to the yellow-necked caterpillar and is commonly found in black walnut trees in the eastern United States. The walnut caterpillar also feeds on pecan, other hickories, birch, oak, willow, honeylocust, and apple. Young caterpillars are red, with grayish white hairs covering their bodies. When they molt into mature caterpillars, they have black bodies with longitudinal yellow stripes along their sides, and the entire body is covered with long white hairs. As they molt, they often crowd together and molt at the same time, leaving their hairy cast skins in a big patch on the tree.

Like the yellow-necked caterpillar, walnut caterpillars feed gregariously. Young larvae skeletonize the leaves, while older caterpillars consume the entire leaf. They also exhibit the defensive habit of raising their heads and abdomens in the air to try and frighten off predators. They may move from tree to tree and can be seen crawling single-file down a tree. There are two generations each year in southern Illinois.

Control can be achieved with the same chemicals that control yellow-necked caterpillars, including *Bacillus thuringiensis* var. *kurstaki*, malathion, chlorpyrifos, and acephate. (Tom Royer)

Annual White Grub Controls

Annual white grubs have hatched and are actively feeding on turfgrass roots throughout Illinois. White grub larvae cause turfgrass injury, as they feed on the roots of grasses. This produces a drought stress that can kill turfgrass. Due to the root pruning, the badly damaged lawns can be lifted, as if they were newly sodded. Control of white grub larvae is difficult, however, for at least two reasons. One is that they are fairly resistant to insecticides, inherently. Perhaps more important is their feeding site, below ground. Movement of insecticides into the root zone of a lawn is almost completely blocked by tying of the insecticide to thatch and organic matter.

To try and get around these considerations, a few control principles should be kept in mind. One is that younger larvae are much more easily controlled than large, late-instar insects. The optimal time to control white grub larvae is when they are young, shortly after eggs hatch. For the annual white grubs, that time is now.

What insecticide to use and how to apply it are the other consideration. An important feature is the ability of the insecticide to avoid undue binding to organic matter. Fair water solubility is also associated with good thatch penetration. Among the various turfgrass insecticides, there is a wide range in these features. Trichlorfon (Proxol or Dylox), and to a somewhat lesser extent bendiocarb (Turcam) and isazophos (Triumph), is among the insecticides that most readily move into the root zone. Triumph is labeled for use only on home lawns, sod farms, and golf-course tees, greens, and aprons.

For homeowners, Dylox and diazinon are recommended; but Dylox may not be readily available. The full labeled rate of diazinon is just enough to control annual white grubs, so homeowners need to measure their turf area accurately and calibrate their fertilizer spreader or other applicator to be sure they apply the correct amount of insecticide. A way for homeowners to avoid calibration is to determine how many pounds of granular insecticide is needed, set the spreader at a low rate of application, and keep applying it evenly across the yard until the proper number of pounds has been applied. Diazinon cannot be used on golf courses and sod farms.

The other insecticides that are available to homeowners and labeled for white grub control are carbaryl (Sevin) and chlorpyrifos (Dursban). Although many people find Sevin effective, it tends to provide spotty control of white grubs at times.

Dursban is not recommended for white grub control, as it has very low water solubility and moves poorly into the root zone. Both Sevin and Dursban are excellent (as are the other insecticides listed above) for controlling surface-feeding insects like sod webworms.

Watering greatly assists in the performance of an insecticide application. Some evidence suggests lawns should be irrigated before application, as this can cause the grubs to feed a little closer to the surface, following the profile of optimal soil moisture. After application, an irrigation treatment of 1/2 inch is recommended.

The only bio-controls that are available, and recommended, are certain types of insect parasitic nematodes. Specifically, if applied correctly, nematodes in the genus *Heterorhabditis* can be very good at controlling white grubs. Correct application entails attention to protecting the nematodes from excessive heat and light by washing them into the turf immediately after application and, ideally, applying them either very early or late in the day, to avoid drying and exposure to sunlight. Nematodes in the genus *Steinernema*, which are more generally available, are ineffective for white grub control. (*Phil Nixon, adapted from Whitney S. Cranshaw, Extension entomologist, Colorado State University*)

MAMMALS

Coping with White-Tailed Deer

In the last issue of this newsletter, there was an article entitled "Those \$#%&! Deer." It was meant to be a humorous article that touched on the issue of coping with deer browsing. Unfortunately, in order to fit as many articles as possible into the newsletter, most of the humorous statements in the article were edited out without consulting the author. The following article should provide more in-depth assistance to those trying to avoid heavy damage from deer.

Deer are most active in early morning and evening. They have a home range of several hundred acres; but this varies with season, sex, and habitat quality. Life expectancy is dependent on hunting pressure and regulations. Records show white-tails living 20 years. Deer are creatures of the forest edge rather than the dense, old-growth forest. They thrive in agricultural areas interspersed with woodlots and stream habitat. They favor early successional stages, which keep brush and sapling browse within reach. Dense cover is used for winter shelter and escape.

For the most part, deer are browsing animals, consuming the leaves, stems, and buds of various woody plants. Forbs are eaten in spring and summer when available. Fruits and nuts, especially acorns, are seasonally very important. Grasses are relatively unimportant. Agricultural crops such as corn, soybeans, small grains, alfalfa, and vegetables are readily eaten when available. Ornamental trees may be permanently disfigured by deer browsing, and young trees and shrubs are damaged when deer rub their antlers on trunks and limbs.

Identifying the feeding damage of deer is not difficult. Because deer lack upper incisors, browsing usually leaves a jagged or torn surface on twigs or stems; whereas rabbit or rodent damage is identified with a sharp, 45° cut and is cleanly cut. The height from the ground of the damage often rules out any mammal other than deer. Deer tracks and pellets are also a helpful confirmation of deer damage, as they are usually visible in the area. The hoofprints of deer are about 2 to 3 inches long, split, pointed at the front, and more rounded at the rear.

Repellents have been the most common deer damage control measure used, especially on woody plants. Success with repellents is measured in the reduction, not total elimination, of damage. For expensive nursery stock in areas of deer activity, excluding the deer with fencing is usually the only way to prevent damage.

The effectiveness of repellents depends on several factors. Rainfall dissipates some repellents, so reapplication is necessary after a rain. But some repellents do not weather well, even in the absence of rainfall. Deer hunger and the availability of other, more palatable food will have a great effect on success. In times of food stress, deer are likely to ignore either taste or scent repellents.

Contact repellents are applied directly to the plants and produce an offensive taste while the material is being consumed by deer. They are most effective when trees and shrubs are dormant. New growth that appears after the treatment is unprotected. Young trees should be treated completely, but it is more economical to treat only the terminal growth of older trees. Treatments should be applied to foliage up to 6 feet off the ground. During the growing season, contact repellents can be applied at about half the concentration recommended for winter use.

Hot pepper sauce is sold as Hot Sauce Animal Repellent, but it is not available to homeowners. When sprayed on Christmas trees, a homemade

formulation of 2 tablespoons of hot pepper sauce (Tabasco sauce) in 12-1/2 half gallons of water containing an additive that promotes retention (such as spreader-sticker, Wilt-Pruf, or Vapor-Gard) has been reported to repel deer. The taste of the fungicide thiram repels deer and rabbits and is in several commercially available ready-to-use rabbit and deer repellents.

Area repellents produce an odor that is obnoxious to deer. When using these products, it is important to consider the sphere of influence of an odor-based material.

Reports are mixed on the effectiveness of human hair as a repellent. Some claim success in small areas with specimen trees, while others claim that an empty bag blowing in the breeze is just as effective as one filled with hair. The hair is usually placed in a nylon stocking, onion bag, or other small-mesh bag and hung on the plant to be protected. Several bags can be hung from a fence or string around the perimeter of the area to be protected. You can get hair readily and inexpensively at barber shops. Hair should be replaced several times during the growing season.

Bone tar oil (Magic Circle) is applied as an area repellent by banding soaked rags, saturated cord, or other such devices around the area to be protected. A saturated cord is probably easiest to use. Bone tar oil does not weather well under some conditions. Paradichlorobenzene or naphthalene mothballs or flakes can be used as an area repellent, hung in mesh bags or scattered on the ground. These moth balls or flakes must be replaced as they evaporate.

Fermented egg solids (Deer-Away or MGK BGR) are the main ingredient in a relatively new commercial formulation developed for use on conifer plantations. It presumably acts by odor, and reports indicate that it is very effective. Label directions are very explicit. Available in both liquid and powder formulations, it can be used in a wide variety of damage situations.

Hinder is an odor repellent, in a commercial formulation of ammonium soaps of higher fatty acids. It can be used on fruit trees, ornamentals, and food crops. The manure and urine of tigers, lions, cougars, or other large cats are reported to act as area repellents. The manure can be obtained from most zoos, but its weathering properties are poor. (*Phil Nixon, adapted from Extension Wildlife specialists Robert Corrigan, Purdue University, and Scott Craven, University of Wisconsin*)

HORTICULTURE

Tree and Shrub Fertilization

Fertilization helps maintain the healthy appearance and vigor of trees and shrubs. Vigorously growing plants not only look better but also withstand biological and environmental pressures that can result in plant decline.

Fertilizer applications should be timed so that nutrients are available for periods of rapid growth. Most professionals prefer fertilizing trees and shrubs in the early spring, early summer, or late fall. Spring applications provide nutrients for the initial flush of spring growth, when nutrients are often most needed. Fall applications provide nutrients that are absorbed by plants and stored until they are needed for growth. Additionally, although the top of the plant appears dormant, root growth (and thus nutrient uptake) continues late into the fall. If not absorbed by the roots, however, nutrients such as nitrogen can be easily lost by leaching and thus not available for spring growth. Fertilizers should not be applied to frozen soil.

Determine the need for fertilization by observing nutrient deficiency symptoms or using soil tests. Nutrient deficiency symptoms may include stunted leaves, abnormal leaf color, subnormal growth, and early leaf drop. Diagnosis should be made cautiously because many other factors (such as drought stress, disease, root injury, or herbicide damage) cause these same symptoms. The frequency of application depends on several factors and may vary from an annual treatment to one made every 3 to 4 years.

The preferred method of application is placing fertilizers in holes in the root zone. Because most feeder roots are in the top 2 feet of soil, this method increases contact with feeder roots. Fertilizers should be applied evenly within the plant's drip line. Base fertilizer amounts on the surface area of that space. Some recommendations establish rates on trunk diameter, but these fail to consider the area of application. For example, if you use a diameter-based rate for a large tree growing in a restricted-planter area, you may add enough salts to the soil to injure the tree.

The University of Illinois recommends that fall fertilization rates not exceed 2 to 2-1/2 pounds of actual nitrogen per 1,000 square feet. For trees growing in turf areas, those numbers include nitrogen applied to turf, as nitrogen is mobile and leaches to the tree roots.

Many landscapers are concerned that late-fall fertilizer applications will result in new succulent growth which is susceptible to frost damage. Fertilization alone, at this time of the year, does not result in additional new growth. Plants by this time have already set their terminal buds and are starting their hardening process. However, pruning combined with fertilization *does* result in new growth, and frost damage is likely. Therefore, fertilize in the fall, but wait until the plants are fully dormant before pruning.

For more information, obtain the *Horticulture Fact Sheet*, #NC-9-84, titled "Fertilizing Woody Plants," available from the University of Illinois, Department of Horticulture, 1201 S. Dorner Dr., Urbana, IL 61801, for 25 cents each. (Rhonda J. Ferree)

Leaflets Three, Let It Be

This old adage is a good one to remember if you are sensitive to poison ivy. Along with other weeds that are rampant this season, poison ivy is showing up in ornamental shrub and perennial plantings, probably seeded through bird droppings. When growing among desirable plants, poison ivy is a challenge to control.

Several products are available to control poison ivy, but none offers selective control in landscape areas. In noncrop areas (such as parking lots, industrial areas, and gravel areas without plants), many options are available. Consult the *1995 Illinois Urban Pest Management Handbook* for listings of products labeled to control poison ivy as foliar, basal-bark, and cut-surface treatments.

To control poison ivy in a landscape setting, three methods may prove successful: (1) grubbing or hand pulling the vine when the soil is wet; (2) severing the main vine and pulling it out of the existing vegetation, then treating new shoots that emerge with an herbicide to kill the roots; and (3) treating the foliage with an herbicide, which may mean painting individual leaflets to avoid contacting landscape plant foliage.

Potassium salts of fatty acids (for example, SharpShooter) work well on small seedling poison ivy, but older plants are only suppressed with top kill, leaving roots to regenerate. Glyphosate (for example, Roundup) is most effective when applied 2 weeks on either side of full bloom, in early summer. Ortho makes a couple of homeowner formulations, including triclopyr (for example, Ortho Brush-B-Gon Poison Ivy Killer) and glyphosate (for example, Kleeraway Grass & Weed Killer). Kleeraway replaces the former Kleenup Grass & Weed Killer product.

Should you contact the plant in efforts to clean up an infestation, immediately (within 1 to 3 minutes) wash with cold water and soap, which may prevent development of symptoms. Poisoning depends on direct contact with the plant's oil, which can be picked up from bruised foliage or from contaminated shoes, clothing, pets, and other objects. Poison ivy does not spread from blister fluid as some people believe. (*Rhonda Ferree, adapted from Buckeye Yard and Garden Line 95-13*)

Common Purslane—A Problem Weed in Illinois

Common purslane (*Portulaca oleracea*) has been very prolific in gardens and landscapes this year. Although common purslane is used as a salad vegetable in some countries and was touted as the newest herb by USDA a few years back, it is considered a troublesome weed by most people.

Common purslane is an annual weed with an extremely fibrous root system. The stems are juicy, smooth, often reddish, and prostrate. The leaves are alternate, juicy, and smooth; and the yellow flowers are formed at the leaf axils. Seed from this plant is known to live in soil for as long as 40 years.

Because purslane is particularly a problem in hot, humid, and sunny conditions, this year has been perfect for its growth. This plant is unusually drought-resistant, partly due to its succulence. Research has shown that this plant prefers a smooth, fine-textured seedbed; and, in fact, the small seeds have trouble germinating at soil depths greater than 1/4 inch. In addition, the plant prefers high nutrient content, particularly phosphorous.

Another reason purslane can be particularly troublesome relates to its germination pattern.

Purslane prefers high soil temperatures of at least 80°F. Because high temperatures are required for germination, the weed does not become a serious problem in most of Illinois until June. By that time, much of the preemergence herbicide applied earlier is not as effective.

Fortunately, purslane is easier to control than some other weeds because it is an annual. Cultivation, hand methods, and postemergence herbicides control existing weeds; but additional seeds can germinate in their place. Postemergence herbicides (such as Finale, Basagran T/O, and Roundup) work well on purslane. Preemergence herbicides labeled to control purslane include Casoron, Chipco Ronstar, Dacthal, Devrinol, Pendulum, Pennant, Predict, Princep, Treflan (Preen), and Barricade. Next year, consider applying one of these preemergence herbicides in early summer to catch the purslane before it germinates. (*Rhonda Ferree*)

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HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
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NEWSLETTER

No. 18 • August 30, 1995

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INSECTS

Biweekly Issues

In case you haven't noticed already, we have reached that time of year when we switch to biweekly newsletters because pests are starting to subside, and it allows us to address late-summer and early fall situations. After this issue, there will be two more newsletters, which will carry us most of the way through September. (Phil Nixon)

Scouting Report

Zimmerman pine moth samples have been seen from Champaign, which indicated that most of the moths had emerged, but some pupae were still present August 22. Once the moths emerge, it takes about 2 weeks for the larvae that hatch to be killed by an insecticide treatment. After hatching, the caterpillars wander on the trunks of Scotch, Austrian, and other pines for several weeks before they settle down for the winter under a piece of bark. Sprays of chlorpyrifos (Dursban) or dimethoate (Cygon) within the next 2 weeks should be effective. If you treated in mid-August, control should still be achieved because (on the shaded, furrowed bark of pines) Dursban residues are likely to last about 4 weeks, with Cygon residues lasting 3 to 4 weeks.

Mimosa webworm infestations are being reported from around the state. For the most part, it is too late for meaningful control, as the second and final

generation is well-developed. Insecticide applications at this time may reduce further damage, but the aesthetic damage has already been done.

Viceroy caterpillars are being found commonly on cottonwood in southern Illinois. These caterpillars mimic bird manure, being mostly whitish, with splotches of brown. Their shape appears irregular, larger at the front end. (If you look like something that a predator considers inedible, maybe he won't bother you.) These caterpillars feed singly and usually are not numerous enough to warrant control.

Caterpillars that feed in large groups (such as walnut caterpillar, yellow-necked caterpillar, white-marked tussock moth, and fall webworm) will still be actively defoliating trees. Realize that leaves eaten at this time will not harm the trees. Revenge spraying of large caterpillars that have already caused heavy leaf loss is of dubious value.

Spider mites are continuing to be found, particularly on burning bush or winged euonymus, cotoneaster, and honey locust. Insecticidal soap, summer spray oil, dinoclor (Pentac), fenbutatin-oxide (Vendex), dicofol (Kelthane), abamectin (Avid), propargite (Ornamite), bifenthrin (Talstar), lambda-cyhalothrin (Scimitar), and other miticides should provide control.

Avoid phytotoxicity by spraying wettable powders and soluble powders when practical. If insecticidal soap, summer spray oil, or emulsifiable concentrate formulations are used, plan to spray when temperatures are below 80°F.

Annual white grubs are numerous in turf that was irrigated in the first half of July. Damage from root feeding should be evident throughout the state at this time. Insecticidal control is still effective if watered in with at least 1/2 inch of water. Realize that even brown, heavily damaged turf with so much root damage that it can be pulled back from the soil will likely sprout roots from the rhizomes and survive if irrigated. (Phil Nixon and Tom Royer)

White Pine Sawfly

White pine sawfly larvae are being found in Peoria County. They are found primarily in northern Illinois but also occur in southwestern Illinois. This insect feeds on pitch, red, and mugo pines but strongly prefers Eastern white pine. They feed in large groups, completely stripping branches and small trees of foliage, killing those branches or trees.

The larvae have large black heads and are about 1 inch long when fully grown. They are yellowish, with four rows of black spots running the length of the body and ending in a large black spot. As with all sawfly larvae, they have three pairs of true legs and six to eight pairs of prolegs. Because these insects are related to wasps and are not moth caterpillars, they are not controlled with Dipel or Thuricide. Carbaryl (Sevin), chlorpyrifos (Dursban), diazinon, acephate (Orthene), and azadirachtin (Azatin, Margosan, or BioNeem) are effective, as are synthetic pyrethroids.

When fully grown, the larvae drop from the trees and burrow into the soil to spend the winter as prepupae inside cocoons. Prepupae look like the larvae except that they are rounded and plumper, and the legs are short. They pupate in the spring, emerging as the wasplike adults that insert their eggs into the needles. The eggs hatch into larvae that feed on both the old and new pine needles. (*Phil Nixon*)

Hickory Horned Devil

We have received several calls from southern Illinois concerning a large green caterpillar wandering around on the ground with three pairs of horns on its head. This caterpillar is known as the hickory horned devil, and it is searching for a place to spend the winter.

The hickory horned devil is the caterpillar stage of a giant silkworm moth known as the royal walnut or regal moth. The adult moth has a brown body with yellowish bands. Its hind wings are brown, with yellowish streaks. Its fore wings are slate-colored, with yellowish patches and a reddish brown scaling; its wingspread is about 4.5 inches. Adult moths live for several weeks but do not feed during that time because they don't have developed mouthparts. Plant hosts include hickory, walnut, butternut, persimmon, sumac, ash, sweet gum, and several other trees. The eggs hatch and the larvae feed for 5 to 6 weeks.

A full-grown caterpillar measures 5 to 6 inches long. It is brownish or greenish, with six red horns attached to the thorax. It also has several rows of small black spines along its back. Although it looks fearsome, it is harmless. When full-grown, the larva

leaves the tree that it was feeding on and wanders around searching for a place to burrow underground to pupate. It emerges as an adult moth the following summer, from late May through June. (*Tom Royer*)

Imperial Moth

Imperial moth caterpillars are descending from their host trees to pupate throughout much of the state and seem to be more numerous this year than usual. These caterpillars are 4 to 6 inches long and 3/4 to 1 inch in diameter. They come in two color forms, either green or tan. They have four long and four short yellowish horns behind the head. The body has a row of large, white, oval spots running down each side and is thinly cloaked in long white hair.

These caterpillars feed on a variety of trees but prefer oak, maple, linden, birch, pine, sycamore, sweet gum, and sassafras. As with all of these huge caterpillars, although each individual eats a large number of leaves to produce that much caterpillar bulk, the female moths lay only one or two eggs per tree. For this reason, as well as these caterpillars being relatively few in number overall, controls are not usually recommended.

There is one generation per year. The adult moth emerges in May through June and does not feed. The moth is bright yellow, with brownish to pinkish markings on the wings and body. It has a wingspread that varies from 3-1/2 to 5-1/2 inches. The smaller moths feed on pine and may represent a different species. (*Phil Nixon*)

Hornets

Bald-faced hornets build football-sized and -shaped nests in trees and shrubs throughout Illinois. The nests are started by overwintering females in the spring, with the colonies building in size and the number of individuals through the summer. The nests are now becoming large enough that people are noticing them.

Bald-faced hornets are about 1-inch-long, black wasps with cream-colored markings on the front of the head and the end of the abdomen. Their larvae are legless grubs that are reared within cells in the nest. Although the larvae are legless and never leave the nest, they are predaceous, relying on the adults to bring them meat. The adult wasps actively search for insects, particularly filth flies such as house flies, other muscid flies, blow flies, and flesh flies, whose larvae develop in manure, garbage, and dead animals. In fact, flies are usually low in number near garbage cans if there is a hornet nest nearby.

Captured flies are chewed up by the adult wasps and regurgitated to the larvae as baby food. In the process, the adult wasps consume some juices and bits of meat from this larval food. The adults also feed on sweet juices such as flower nectar and fruit sap. While obtaining nectar, they pollinate flowers. While obtaining fruit sap, they are sometimes surprised by grape, peach, and apple pickers, who may get stung for being so forward as to grab the fruit that the wasps are sitting on. This is a good reason for harvesting fruit in the evening, when the wasps have returned to their nests for the night.

The hornet nest consists of three or four layers of cells held apart by paper columns. Each layer of cells is similar to the single-layered, umbrella-shaped nests that paper wasps build under the eaves of buildings. This multi-storied nest is surrounded by a several-layered envelope. The entire nest consists of paper. The wasps scrape wood surfaces to remove a small amount of wood fiber and chew it with saliva to form a pulp that they apply to the nest, which dries into paper. The multi-shaded brown and gray bands and stripes evident on the outside of a hornet nest are due to the different woods that are used in nest construction.

The nest usually has a single opening near the bottom, where the adult hornets come and go. At night, the majority of the adult wasps are inside the nest, but a few sit on the outside of the nest and on surrounding tree limbs. These individuals are replaced about every half hour through the night so that these wasps are usually alert to attack.

In late summer, reproductive males and females are produced that mate. The males die and the females overwinter under tree bark, with each mated female starting a new nest the following spring. The paper nest is built in one growing season and never reoccupied. The old workers and queen in the nest eventually die out, but nests in the fall will usually have a few live workers within them. Old nests soak up rainfall and fall apart by the following spring.

Bald-faced hornets are very protective of their colony and usually attack if someone approaches within 3 feet of the nest. Many nests are located high in the tree so that even people walking directly under the nest are more than 3 feet below it and not viewed as a threat. The hornets definitely perceive child-thrown rocks as a threat and will attack and sting repeatedly if provoked.

Nests are normally destroyed by spraying aerosol wasp-and-hornet spray into the opening of the nest late in the evening. It is important to wear protective

clothing to protect yourself from the sentries on the outside of the nest. Long pants tucked into socks, heavy jacket, gloves, hat, and bee veil are important as protective clothing. It is possible to coexist with most nests and let the coming cold weather remove the hornet presence. Overwintering females apparently wander far from home because areas that have a hornet nest one year rarely have one the next. (*Phil Nixon*)

PLANT DISEASES

Wood Rots and Decline of Trees

The Plant Clinic has received several samples of large mushroomlike fungi found growing at the base of trees or, aurally, on the trunk. These fungi are the spore-bearing stage of fungi that may be living on declining roots or trunk tissue. Their presence may indicate a root rot (such as *Ganoderma* on honey locust) or some other stress in the tree that may not yet show as outward symptoms of decline. In other cases, the tree may have been growing poorly, with a general lack of vigor for more than a year before fungal fruiting structures are seen. Wet weather in some areas of the state has triggered the formation of the spore stage.

No fungicides can help a tree ailing from these wood rots and decline. Use approved cultural practices to improve tree vigor, including watering weekly with 1 to 2 inches of water, cutting out dead branches in the dormant season, fertilizing in late fall or early spring, and keeping traffic off the root system. Some specialists believe that watering or fertilizing very old or very large trees does not benefit the tree. For trees that do respond, these measures may help the tree continue to live for many years. The wood rot and decline fungi do not have to be fatal.

For more information concerning these diseases, consult *Report on Plant Diseases (RPD)*, no. 642, "Wood Rots and Decay." (*Nancy Pataky*)

Leaf Spot and Melting Out of Turf

Helminthosporium leaf, crown, and root rots of turf are caused by fungi in the genera *Bipolaris*, *Drechslera*, and *Exserohilum*. These fungi were originally lumped into the *Helminthosporium* genus but have been segregated out as research has clarified the differences in these *Helminthosporium* types. We will refer to them as *Helminthosporiums* in this article.

The leaf spots caused by these fungi are small lesions, varying from reddish brown to purplish black. The centers are often tan, and the lesions typically have a dark, reddish brown border, giving an "eye-spot" appearance. In wet weather, the lesions may merge, yellowing the turf or producing a tip dieback. The spot diseases are favored by dry periods alternating with prolonged, cloudy, moist weather and moderate temperatures. The disease progresses quickly when grass is cut too short, turf is slow growing, or fertility is low and where there is excessive shade or excessive nitrogen use. Other stresses can also contribute to disease severity.

Helminthosporium leaf spot may develop into a more serious crown and root rot disease in warm to hot, dry weather. This phase of the disease complex is known as melting out. It is characterized by a reddish brown decay of the stem, crown, rhizome, stolon, and root tissues. Affected plants lack vigor, have poor root development, and appear drought stricken. The affected areas may be small and circular or large and irregular.

Some areas of the state may still be seeing the melting-out phase or at least damage from that phase. Now we are beginning to see the return of the leaf blight phase as the fungus moves back up the blades with cooler temperatures and the moisture on the blades.

Cultural controls are usually effective with the leaf spots. Mowing is extremely important to disease control. Mow at the recommended height for the species. Mow frequently enough so that no more than one-fourth to one-third of the leaf surface is removed at one time. If you have fertilized your lawn, this may mean mowing more often. It is important to fertilize the lawn without letting the nitrogen level become excessive. Turf specialist Tom Voigt has some guidelines on how much fertilizer to apply to a home lawn and when to make the applications. This disease is one that will be suppressed with proper fertilization.

Information is available on leaf spot disease resistance by some bluegrass cultivars adapted to Illinois. The resistance varies somewhat by location. Consult *RPD*, no. 405, for more details. In cases where cultural and cultivar resistance is not effective in disease control, then fungicide sprays may be needed on a preventive schedule. Chemical recommendations are available in the *1995 Illinois Urban Pest Management Handbook*. Fungicides effective against *Helminthosporium* are preventive: They protect healthy, unaffected plants. If badly damaged

turf requires replanting, mid-August is a great time to do the job. (Nancy Pataky)

Sooty Blotch and Fly Speck of Apple

Fruit pathologist Steve Ries says that these diseases should be obvious this year. They are usually found together and are common during years with a cool, wet spring and rains in the late summer. Sooty blotch causes sooty, dull black spots or blotches with an indefinite outline on the fruit. Fly speck causes groups of six or more slightly raised, round, shiny black dots on the fruit. The spots resemble fly excreta, thus the name.

The diseases are more prevalent in trees that do not dry well. Usually this means that any practice promoting rapid drying aids in disease control. Prune the trees so that the center is open to air movement. Pruning should be done in the dormant season. Also remove wild brambles in the area.

Chemical control for these diseases is possible, but effective fungicides must be sprayed, beginning 2 weeks after bloom (two or three sprays) and again 2 or 3 weeks before harvest (two more sprays). Obviously, it is too late to use fungicides this year. Registered fungicides are listed in Circular 1145, *Home Fruit Pest Control* (for home growers), and Circular 1292, *Midwest Tree Fruit Handbook* (for commercial growers). Dr. Ries states that now is a good time for resolving to do better next year because sooty blotch and fly speck can be controlled.

For persons interested in eating infected apples, Dr. Ries points out that the fungi are on the skin of the apple. You can rub off the spores and eat the apple, or you can also dip them in a mild clorox solution and then rinse and dry them. For more information about these diseases, consult *RPD*, no. 815, "Sooty Blotch and Fly Speck of Apple." (Nancy Pataky)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

Major authors are Phil Nixon and John Lloyd, (217)333-6650, and Tom Royer, (618)692-9434, entomology; Nancy Pataky, plant pathology, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulture, (217)333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. The editor is Mary Overmier, and the typesetter is Oneda VanDyke, both of Information Services.

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
illinois natural history survey, champaign

NEWSLETTER

No. 19 • September 13, 1995

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

What the Heck Happened to MY Turf This Summer?

Until now, Mother Nature has not smiled on us, and 1995 has proven to be a horrible year for maintaining high-quality turfgrass. In August, diseases such as brown patch, dollar spot, Pythium, anthracnose, and summer patch have all severely damaged turf. Crabgrasses, spurge, and other weeds are going gangbusters in areas where turf has thinned or died.

It is important to understand that the weather during the 1995 growing season has been the worst in more than 15 years. The problems really began last spring when we experienced a long wet, cool period. Spring is the most important period of the year for root growth and development of cool-season turfgrass. Because many soils remained damp and cool, the turf developed shallow roots. Conversely, the conditions did cause a surge in shoot growth that required frequent mowing. This may also have used storage carbohydrates for shoot (rather than root) production.

Later, in June and July, many areas were exposed to extended periods of hot temperatures and below-normal precipitation. Maintaining turf quality when root systems are shallow is difficult during hot and dry conditions, even when adequate irrigation water is available. In addition, when soil temperatures are

high, the root systems of cool-season turfgrasses regrow only sporadically, or not at all. Also during this time, in unirrigated areas, turfgrasses commonly went dormant and some turf died.

While temperatures remained hot in August, humidity and precipitation increased. During this period of high temperatures and increased moisture, severe, even uncontrollable, disease problems developed on stressed turfgrasses having poorly developed root systems. In addition, the extended period of high soil and air temperatures may have caused both direct and indirect high temperature injury and death. This may be especially true of annual bluegrass, a grass that has poor heat tolerance and is prone to decline during periods of high temperature. Also keep in mind that creeping bentgrasses and perennial ryegrasses have predominantly annual root systems. The root systems of these grasses commonly decline during summer's heat, and root regrowth generally does not occur until soil temperatures drop below 80°F.

At present, efforts should be made to improve turf stands. Use proper management practices to take advantage of the natural growth cycles of cool-season turfgrass. Any overseeding or replanting should be done with high-quality seed or sod. In the future, continue managing turf to produce the best root systems possible. Finally, always remember that Mother Nature can ruin even the best management and planning. (Tom Voigt)

Turfgrass-Management Practices for Late Summer-Early Fall

Late summer-early autumn is a time when horticultural activities often wind down for many gardeners. This period, however, should not be ignored by homeowners desiring high-quality lawns. Several turf-management activities are best performed at this time and, when performed appropriately, result in a healthier, higher-quality turf the following spring.



1. New seedlings (establishment, renovation, or overseeding) of cool-season turfgrasses are best completed before the middle of September in the northern two-thirds of Illinois. Seeding during this time allows root systems to develop through fall and spring before facing the heat and drought of summer. Late summer–early fall seedlings also face less competition from annual grassy weeds and fewer disease problems during establishment and maturation than do spring seedlings.
2. Fertilize cool-season turfgrasses (Kentucky bluegrasses, perennial ryegrasses, and the fescues) in early September. This fertilizer application provides mineral nutrients for the flush of growth that accompanies fall's cooler temperatures. In addition, this helps the turf to recover from summer stresses and improves health before winter. In areas of Illinois receiving large amounts of precipitation this past summer, this fertilization is especially important. Spring-supplied fertilizers are probably depleted due to heavy turf growth and leaching during wet summer periods.
 Warm-season turves (zoysiagrasses, bermudagrasses, and buffalograsses) should not be fertilized during this time of year, as active growth is beginning to slow.
 Fertilize cool-season grasses a final time after the last mowing of the season, usually sometime in November. This fertilization provides minerals for the early spring flush of growth.
3. Irrigate turf in autumn if the weather is dry. It is important that turf goes into winter in a non-stressed, well-hydrated state.
4. Mowing heights can be lowered as the growth of cool-season turfgrasses accelerates in autumn. Maintain Kentucky bluegrasses, perennial ryegrasses, and fescues at 2 to 2-1/2 inches during this period.
5. While turf growth is active in autumn, cultivation and thatch-removal activities (core aerifying, dethatching, power raking, slicing, spiking, and vertical mowing) can take place. Be sure these activities are completed early enough in the fall for turf recovery to take place before the onset of severe cold weather.
6. Postemergence broadleaf weed controls can be applied to perennial broadleaf weeds (for example, dandelions, buckhorn and broadleaf plantains, and ground ivy) as they begin active growth in autumn.

Be sure to read, understand, and follow all label instructions for the safest, most effective application of herbicides. (*Tom Voigt*)

Water Landscape Plants

The rapid onset of poor-looking landscape plants is cause for concern. Many landscape plants in Illinois are suffering from extremely dry weather. Symptoms include severe leaf wilt, yellow leaves, early fall coloring, and leaf scorch (browning along the margins) on broadleaf plants and brown, dying turfgrass. The symptoms are a result of the roots' failing to supply sufficient water to the leaves. This inability is influenced by the moisture content of the soil and by the location and condition of the root system. The drought conditions have significantly reduced some plant root systems, making them unable to supply enough water to compensate for the tremendous amounts lost through the leaves. Roots were stressed early on, and even the rainy weather in June and July was not enough to help revive the plant root systems.

As would be expected, some plants are affected more by drought conditions than others. Especially affected are potentilla, hydrangea, viburnum, euonymus, and holly shrubs; redbud trees; spruce and hemlock conifers; and bog plants such as iris and astilbe. Fortunately, our native prairie species adapt well to these conditions; and, although the top growth is dying back, the dieback helps build reserves into the crown for growth next season. Good knowledge of a plant's normal growth habits is important. For example, although many white pine continue to show signs of stress (see "White Pines Suffer," issue no. 3), white pines naturally drop last year's needles in late August through mid-October. Most other pines and spruces, however, keep several years' needles. If they begin to drop last year's needles, severe stress or disease could be present.

Save the landscape plants! Water stressed plants now to encourage recovery growth and root revival. Apply enough water to penetrate deeply within the drip line. Dying turf areas should be overseeded or renovated prior to watering (see "Turfgrass Management Practices for Late Summer–Early Fall"). Newly installed plants, especially those in containers, should be watched carefully and watered properly. Never overwater. To prevent plants from sending out succulent, frost-susceptible growth, avoid fertilizing or pruning until the plants are dropping their fall leaves. (*Rhonda Ferree and Floyd Giles; adapted from The P.E.S.T. Newsletter, vol. 4, no. 13*)

PLANT DISEASE

Plant Clinic Closing

It is fall already, and the clinic is about to close for the season. The last day of operation this year is September 15, and the first day for next year will be September 16.

Any samples received at the Plant Clinic before September 15 will be processed and reported. Anything received after that date will not be processed. There is no funding to staff the clinic during the winter months, so diagnosis is handled by the local Cooperative Extension offices with their own labs. In most cases, the lab is not needed during the winter months.

If you need additional help beyond the local Extension office, decide which department is most likely to be involved and send your samples to that department. Each office handles samples differently. Addresses to use if more help is needed include the following:

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Urbana, IL 61801

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Weed or herbicide:

N-305 Turner Hall
1102 S. Goodwin
Urbana, IL 61801

Disease specimens:

N-533 Turner Hall
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(Nancy Pataky)

Raspberry Disorder

White drupelet disorder is being observed on red raspberries in Illinois. This disorder is characterized by individual drupelets that enlarge normally but fail to develop red pigment. The white drupelets may occur singly or in groups. They may be randomly distributed on the fruit surface but are always on the sunny side of the berry. Except for the bleached appearance, the berries are normal. There is no rot, and berries are usable. Unfortunately, affected berries are difficult to sell. This raspberry disorder is quite rare and occurs only to berries exposed to high

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intense solar radiation. This is a problem, but isn't practical.

Plants are susceptible to stress, especially under stress. Of course, plants have their own moisture and given those conditions, they can become diseased. We saw an abundance of diseases, especially under moisture stress in 1996. This year has had a lot of water in the spring and high temperatures in the summer. The recommendations in the past have been to fertilize to help with the number of verticillium wilt and other diseases and root-

Pruning wood in the fall. As a rule, prune only when the tree is dormant. For woody plants, prune in more light, and in the spring. If you can burn or remove it from the site, pruning of the fungus on the wood for next year.

Consider making a map

of the layout of this year's planting now. This way you can remember the location of plants, and you can move related annuals or vegetables to another area of the garden to fight soilborne pathogens. (Nancy Pataky)

Oak Problems

The Plant Clinic has received many oak samples in the past several weeks. Many of these were the result of the article on oak wilt (issue no. 13) and recent news releases on that disease. In some cases, oak wilt was actually present. Many other individuals complained of scattered branch death or the death of branch tips. Still others were worried about the spotting on the foliage. Oaks have not fared well this year.

If death of branches appears to be starting at the top of the tree and consumes entire branches, then oak wilt is still suspect. The cases we have seen with scattered branch death have usually been attributed to cankers (most often *Botryosphaeria* canker, but the fungal cause is not too important). Cankers are stress-

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temperatures (over 90°F) and intense solar radiation. Shading of the fruit reduces losses but isn't practical. (Steve Ries)

Predisposition to Disease

As with humans, plants are more susceptible to disease pathogens when they are under stress. Of course, the specific pathogen has its own moisture and temperature requirements; but, given those conditions, a stressed plant is more likely to become diseased than a vigorous plant. In 1995, we saw an abundance of canker problems and vascular diseases, especially on trees and shrubs that were under moisture stress in 1994. Expect more of the same in 1996. This year has provided us with an excess of water in the spring and an extended drought with record high temperatures in the summer. Follow horticulture recommendations in this newsletter for watering and fertilizing to help vigor. We predict a greater number of verticillium wilt cases next year, as well as canker diseases and root-related problems.

Prune out cankered and dead wood in the fall. As a precaution against oak wilt, prune only when the tree is dormant. Opening up the center of woody plants helps promote faster drying, lets in more light, and reduces foliar and stem diseases. If you can burn or bury plant debris, or at least remove it from the site, this helps cut down on overwintering of the fungus on the plant and on inoculum buildup for next year.

For annuals and vegetables, consider making a map of the layout of this year's planting now. This way you can remember the location of plants, and you can move related annuals or vegetables to another area of the garden to fight soilborne pathogens. (Nancy Pataky)

Oak Problems

The Plant Clinic has received many oak samples in the past several weeks. Many of these were the result of the article on oak wilt (issue no. 13) and recent news releases on that disease. In some cases, oak wilt was actually present. Many other individuals complained of scattered branch death or the death of branch tips. Still others were worried about the spotting on the foliage. Oaks have not fared well this year.

If death of branches appears to be starting at the top of the tree and consumes entire branches, then oak wilt is still suspect. The cases we have seen with scattered branch death have usually been attributed to cankers (most often *Botryosphaeria* canker, but the fungal cause is not too important). Cankers are stress-

related diseases and can best be fought by improving tree vigor. When only the tips of branches have been killed, look for injuries, cankers, insect feeding, or other mechanical problems at the base of the affected area. Our experience is that none of the above was present, and the tissue was severely desiccated. Our conclusion was moisture stress from an actual drought situation or possibly from root injury that forced a droughtlike condition.

The leaf spotting that we have seen has been from three common foliar fungi—*Discula*, *Marssonina*, and *Actinopelte* (*Tubakia*). The first is a common anthracnose pathogen, discussed in issues no. 2 and 4. The latter two are commonly found in association with pin oaks' having iron chlorosis. Fungicide treatments for these leaf spots would be used only on a preventive basis. There will not be any new leaf formation for this year, so sprays would be pointless. The leaves no longer have much usefulness to the tree. Buds for next year have been formed, and photosynthesis is very slow at this time of year. In other words, no treatment is recommended—other than the normal, vigor-promoting practices. If anything, have the owner rake and remove fallen leaves and prune out dead wood to remove some of the inoculum for next year. (*Nancy Pataky*)

INSECTS

Sod Webworm

One of the pests that commonly occurs in Illinois during hot, dry summers is sod webworm. Sod webworm usually does not become a problem in Illinois because the damper climate that is typical during the growing season promotes the occurrence of fungi that kill many of the larvae. Roscoe Randell, the retired Extension entomologist who used to be the coordinator of this newsletter, reports their occurrence in some Illinois turf.

A 1-inch long, slender, tan or grayish caterpillar with brown spots, sod webworm lives in a silk tunnel in the thatch. It emerges at night to clip off turfgrass at the crown. At first, damaged turf has scattered brownish areas, which later merge into large areas as feeding continues.

Close observation reveals that the brown areas are not caused by brown grass blades, but rather by the thatch showing through where grass blades are missing. The green grass blades exist as 1/8-inch long stumps where the caterpillar clipped them off. Infested areas also have accumulations of green, pin-

head-sized balls of caterpillar feces. The sod webworm caterpillars attract feeding flocks of starlings or other insect-eating birds, and the presence of these birds is another sign of attack.

Control the caterpillars with applications of carbaryl (Sevin), chlorpyrifos (Dursban), diazinon, or trichlorfon (Dylox). The nematode *Steinernema carpocapsae* (Biosafe or Victor) is also effective in controlling this pest. (*Phil Nixon*)

Late Summer–Early Fall Defoliation

Several defoliators, primarily caterpillars, occur in late season and can cause heavy defoliation. It is important to realize that this defoliation may not justify control efforts.

Fall webworm is present in extremely high numbers in some areas of the state at this time. Two areas, southeastern Illinois south of Effingham and northwestern Illinois, are being hit particularly hard. Trees that are 15- to 20-feet tall, with five or more colonies, are fairly common. With each colony containing about 100 caterpillars, these trees are being completely defoliated.

Cecropia moth, hickory horned devil, and other giant silk moth caterpillars are being found commonly in various areas of the state. Cecropia caterpillars are green, with blue and red knobs behind the head. When fully grown, giant silk moth caterpillars are 4 to 6 inches long and 3/4 to 1 inch in diameter. Each one of these caterpillars probably represents a couple of branches worth of consumed leaves.

Unlike most years (when attacked trees would usually contain only one or two giant silk moth caterpillars), 10 or more caterpillars per tree are common this year. Thus, instead of the defoliation per tree consisting of a couple of branches, the defoliation is very noticeable; and, occasionally, entire trees are being defoliated. Although the giant silk moth adult usually lays clusters of 12 to 16 eggs, most of the resulting caterpillars usually die before fully grown. This year, however, they appear to be surviving.

Yellow-necked, walnut, and white-marked tussock moth caterpillars are other species that can cause this defoliation. These species feed in colonies of about 100 caterpillars and, as a group, eat a lot of tree leaves.

Why is this defoliation occurring? It is probably due to the hot, dry weather that has occurred throughout the state this year. A major cause of mortality for insects, and particularly for caterpillars, is fungal disease. There are several entomopathogenic fungi, that is, fungi that specialize in attacking insects. These

fungi, like the fungi that attack plants, transmit better in moist, cool conditions. Conversely, they do poorly in hot, dry conditions, which probably resulted in fewer insects being attacked by these fungi this summer. So the higher number of caterpillars this summer is more likely to have been caused by a lower death rate than a higher level of reproduction.

Defoliation this late in the growing season is not likely to harm the tree. Through photosynthesis, the tree leaves have already produced essentially all the sugars for the tree that they will for the year. It is also close enough to natural leaf-drop that the tree is not likely to use stored energy to set new leaves for replacing the leaves eaten. For these reasons, controlling the caterpillars will not benefit tree health.

Aesthetically, control may not be warranted because the branches will be bare anyway within a few weeks from natural leaf-drop. In addition, once the summer season ends with the occurrence of Labor Day, the start of school, and the introduction of new television shows, most people spend much less time outdoors even though it is still warm. Thus they are not bothered as much by leafless branches or trees—because they aren't outdoors to see them.

Reducing the number of caterpillars this year has little effect on the number next year. There is so much more mortality to the whole insect population through natural causes (such as fungal diseases, temperature extremes, predation, and parasitism) that the actions of humans through insecticide use or other control methods are negligible. These control methods definitely help individual plants during the season when they are applied, but they are not important to the overall numbers of insects. Controlling insects this year in the hope that there will be fewer next year is not very valid. (*Phil Nixon*)

Bandedwinged Whitefly

Adult bandedwinged whiteflies, *Trialeurodes abutilonea*, are present in large numbers throughout Illinois. They feed on velvetleaf, the field weed, and build up to very large numbers on it. At this time of year, the adult whiteflies leave velvetleaf in large numbers, are found on many kinds of plants, and are even noticeable just flying around during the daytime.

After entering greenhouses through open vents, whiteflies feed on many kinds of plants. Nursery employees and landscapers have also been noticing them on many different plants. This whitefly normally feeds only as an adult on these plants. Few or no nymphs are usually seen. They will, however, reproduce heavily on flowering maple, *Abutilon*, which is

in the same genus as velvetleaf. Their sap-feeding can cause leaf discoloration and even leaf-drop in severe infestations.

Bandedwinged whiteflies are whitish and pinhead-sized, like other adult whiteflies. On their front wings, these whiteflies, true to their name, have broad, dark gray bands, which are distinguishable even with the unaided eye. With a hand lens, the bands are obvious. Greenhouse, sweetpotato, and silverleaf whiteflies do not have these bands. If nymphs are present, they appear as pinhead-sized, clear, scalelike insects on the leaf undersides.

In most situations, control is not needed because the adults' feeding is not likely to cause severe damage, particularly because the leaves that they are feeding on will be dropping soon anyway. If control is needed, bandedwinged whitefly is easily controlled with almost any contact insecticide. Because velvetleaf isn't sprayed with an insecticide and Illinois field crops where velvetleaf is found are rarely sprayed with insecticide during the summer and fall, there is little if any insecticide resistance. Insecticidal soap, malathion, summer spray oil, diazinon, and any of the synthetic pyrethroids should be effective. (*Phil Nixon*)

Conifer Bark Beetles

While on vacation in the Rocky Mountains, I had an opportunity to observe what some vacationers from California referred to as red leaf pines. Indeed, many of the lodgepole pines in the area had red needles; but it was because they were dead. Growing up in Wyoming, I remember major forest fires that swept through the mountains, feeding on lodgepole pines that had been killed by the mountain pine beetle. It was all a part of the natural cycle. The fires would eliminate the dead and dying trees, greatly reduce the beetle problems, and put nutrients back into the soil for new seedlings.

The mountain pine beetle, *Dendroctonus ponderosae*, is just one of many bark beetles that attack conifers throughout the United States. Bark beetles are not all the same. There are over 600 species of bark beetles that attack different species of trees and cause various amounts of damage to their hosts. Besides causing problems for the lumber industry and increasing the potential for forest fires in natural stands, bark beetles can attack trees in urban areas. An example of a forest pest that is now found in urban areas is the southern pine beetle, *Dendroctonus frontalis*, which has been found attacking loblolly pines in suburban locations in Florida.

Southern pine beetle, mountain pine beetle, and other *Dendroctonus* species are part of a natural system and will attack trees in those situations. In most urban and suburban areas, large populations of trees are not available to support destructive populations of these bark beetles. On rare occasions, problems can occur when suburban encroachment occurs into areas where the trees and these species of beetles already exist. More commonly, the many *Ips* species of bark beetles that are attracted to stressed trees are the predominant bark beetle pests in urban/suburban areas, nurseries, and shelter belts in Illinois.

The most common form of stress is moisture deficit. Conditions that predispose conifers to moisture stress are not limited to forested situations, and may actually be enhanced in non-natural ornamental settings. Prevention through proper care and maintenance of newly planted and established trees effectively reduces the potential for bark beetle problems in urban and suburban settings and in shelter belts. Retaining fallen needles as a mulch around the base of trees reduces competition from turfgrass and other plant materials and reduces moisture stress. Watering a tree during drought periods reduces its chance of becoming attractive to bark beetles. Too much water can also cause problems, though, by killing roots and decreasing the tree's ability to absorb nutrients and water when the flooded conditions have passed. A tree that has survived waterlogged conditions may require additional watering in the following years to stimulate root growth and compensate for the roots killed by flooded conditions.

Most bark beetle adults lay eggs in galleries they excavate. The eggs hatch into larvae that feed on the phloem, cambium, and sapwood of the host tree. In large numbers, the larvae can kill infested portions of the tree. In many cases, the bark beetles also act as vectors of plant diseases. Some species of beetles may additionally inoculate trees with parasitic and decay fungi when the beetles feed or excavate galleries.

One avenue that entomologists have been pursuing for management of bark beetles is the use of pheromones. Sex pheromones that are used to attract male bark beetles to females for mating are being used in

forested situations to disrupt the reproduction of the beetle populations. Flooding the area with this type of pheromone confuses the beetles and prevents them from mating. This type of management is done on a large scale and therefore doesn't quite fit nicely into the homeowner's arsenal. However, research that shows promise for urban situations is being done with aggregation and anti-aggregation pheromones for some species of bark beetles. Aggregation pheromones are produced by some species of beetles to attract others of their species to a good host tree. By attacking in-mass, these species of bark beetles can overwhelm the defenses of the tree. Anti-aggregation pheromones have the opposite effect by deterring the species of bark beetles from attacking trees that are already full of beetles. Researchers are examining the use of these anti-aggregation pheromones in protecting individual trees from southern pine bark beetle attack in suburban Florida. All the data aren't in yet, but the results look promising for this technique. Eventually, this type of pheromone may be a management tool for the species of bark beetles that attack ornamental conifers in Illinois. However, the best management tool is to prevent bark beetle attack by keeping our conifers healthy and stress free. Attacked trees rarely benefit from insecticide applications, but trees occasionally recover if growing conditions are improved. (John Lloyd)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agriculture, university of illinois at urbana-champaign
illinois natural history survey, champaign

NEWSLETTER

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Last Issue for 1995 and Index

This is the last issue of the *Home, Yard & Garden Pest Newsletter* for 1995. An index is included to help you find articles published during the year (if you kept your issues).

Late this fall, you should receive an application form to subscribe to next year's newsletter. We appreciate your continued interest in this publication; and, as always, if you have any suggestions, please send them to me. My address is Phil Nixon, Department of Natural Resources and Environmental Sciences, 172 Natural Resources Building, 607 E. Peabody Dr., Champaign, IL 61820. (Phil Nixon)

Newsletter Survey

A survey was sent to a random set of 247 paid subscribers of the *Home, Yard & Garden Pest Newsletter* during this past summer to find out how we might make the newsletter better. The response rate was 87%. The results will be shared with the authors of the newsletter, and we will consider the results carefully.

Professional horticulturists are the majority of the subscribers, with 17% being lawn-care professionals; 17%, professional landscapers; 14%, garden-center operators; and 10%, other horticulture professionals. Agricultural chemical professionals make up 14% of the subscribers. Master gardeners comprise 11%, and farmers and farm managers another 11%.

Our readers have a high level of education, with 64% having college degrees and another 22% having some college experience. This compares to only 27%

and 19% of Illinois residents overall in those two categories, respectively.

We asked some questions about the newsletter format. We have been thinking about putting out up to five winter issues in addition to the current 20 growing-season issues. Half of those surveyed said that they would pay for additional winter issues, and another 27% said they might be willing to.

Most of you like the current length of the newsletter, with 73% preferring two sheets, printed on both sides, and 19% preferring three sheets both sides. We have received feedback before that this length allows one to get needed information without spending too much time reading it during the busy growing season. The current format of a mix of long and short articles is preferred by 83%, although 15% would prefer more short articles, covering more topics.

We have considered changing the name of the newsletter because some feel that the name implies that it is a newsletter for homeowners, rather than professionals. This is apparently not a problem for you because 66% wanted the name to stay the same; so we will keep it that way.

As authors, we see one of the main purposes of the newsletter as letting you know of pest problems that are arising or will soon arise. We are apparently accomplishing that goal because 99% of you feel that you find out about important pests and new pests as soon or sooner through this newsletter than any other method.

We also wanted to know if we are covering the type of information that you want to know. When asked to pick the topics they wish to see in the newsletter, 66% chose turfgrass pests (diseases, insects, and weeds), 63% chose horticultural practices such as fertilizing and pruning, 62% chose woody ornamental pests, 49% chose herbaceous pests, and 27% chose household pests. Other choices, such as pesticide registrations, phenology, and greenhouse pests, were chosen by few people. With these re-



sponses, we will keep the topics similar to those in the past but increase the coverage of herbaceous pests.

Computer access is increasing, and 18% of the readers surveyed have access to the Internet. Most of those also have access to the World-Wide Web. We are interested in keeping in touch with evolving communication methods and feel that, eventually, this newsletter primarily may be produced electronically to provide quicker access. This year, this newsletter became available on the Internet. It is obvious, however, that most of you rely on paper copy; and the newsletter will continue to be available in that form.

Besides the responses just summarized, comments were asked for and received—in quantity. These will be read and considered, as well as the responses to the survey questions. Thank you for your participation in the survey, and we welcome any suggestions that any of you have. (*Phil Nixon*)

ISA On-Line

The International Society of Arboriculture (ISA) has developed an Internet “home page” with assistance from the University of Illinois. The home page is accessible if you have a computer with a modem, a connection to the Internet with a service provider, and a World-Wide Web software package. The service, called ISA On-Line, will provide a one-stop service for immediate and up-to-date, research-based information on arboriculture, plant health care, and pest management.

Information on the Internet is interconnected. Links are made to connect information on multiple networks all across the world. For example, a document on the bronze birch borer located at the University of Illinois can have a link to an article on resistant birch varieties located at the North Central Forest Experiment Station in Minnesota, which can in turn be linked to images of the bronze birch borer at Michigan State University. Anyone who develops an informational stop (a home page) along the Internet can create links to information anywhere on the Internet.

All the ISA resources will be “on-line” within the year, with links provided to informational resources in arboriculture and plant health care. Many universities have plant health care and integrated pest management information on-line already. ISA On-Line provides links to relevant research-based information produced by researchers and extension professionals for all regions in the United States and will eventually develop links throughout the world.

Currently, links to all university Extension services, a searchable index of the *Journal of Arboriculture*, the

Compendium of Plant Health Care Information, and a searchable list of certified arborists are on-line.

Abstracts of *Journal of Arboriculture* articles, a list of *Arboriculture Abstracts*, the ISA membership list, and multimedia clips of ISA videos are in progress. An arboriculture news group is also on-line, which allows individuals to discuss issues of arboricultural significance. ISA On-Line is a work in progress, and it has enormous potential. The address to the page is <http://www.ag.uiuc.edu/~isa/> (*John Lloyd*)

HORTICULTURE

Winter Preparation for Ornamental Plants

For most parts of Illinois, this year has been difficult for growing and maintaining plants. Because many plants are already stressed, basic winter preparation work is all the more important. The first step in avoiding winter damage or injury is selecting plants that are winter hardy for your area. Healthy, well-maintained plants, in general, survive the winter better. Following are several items to consider in preparing plants for winter.

Watering. Watering practices were discussed in the last issue. Adequate watering is essential in the fall to assure that plants go into the winter months with a good supply of moisture in the soil around the roots. This is especially true for plants susceptible to winterburn, such as broadleaf evergreens (azaleas, hollies, boxwoods, and rhododendrons) and narrowleaf forms (junipers, yews, and arborvitae). Winterburn injury appears as dead foliage that has been burned. It is caused by desiccation, where plant transpiration exceeds moisture absorption. As soils freeze in the winter, plants may not be able take up enough water to keep up with the transpiration of the plant, thus the exposed foliage dies. Most desiccation results from strong, drying winds on sunny winter days.

Antitranspirants. Another way to help prevent rapid moisture loss through the leaves of needles is with antitranspirants. These are waxlike products that are sprayed on the leaf surfaces to slow transpiration. Antitranspirants should be applied before severe winter sets in.

Tree wraps. Other types of cold injury include sunscald and frost cracks, which occur from extreme temperature fluctuations. Sunscald is actually a freezing injury and is most likely on young trees. Sunscald spots may develop into a frost canker. Use tree wraps on susceptible trees to help reduce extreme

temperature fluctuations. Frost cracks occur when the outside cells of the tree lose water, shrink, and pull apart, causing a crack to open longitudinally with the grain of the wood. Again, tree wraps may help; but some species are simply more prone to cracking than others. Sometimes trees shaded on the south and west sides (where the tree heats up the most) crack less.

Specially prepared paper-wrap material should be used because it has many inherent qualities that cannot be duplicated with any substitutes. The wrap is crinkled to give it more elasticity for a tighter wrap. The wrinkled surface also provides good insulation against sun and wind. The paper is treated to withstand breakdown in rainy weather.

Mulching strawberries and perennials. Strawberries should be mulched to protect the plants during extreme cold winter weather and against damage from heaving during alternate freezing and thawing weather. Use a loose organic material such as clean, seed-free wheat straw. Apply mulch after several frosts in the fall, but before the temperature drops below 20° F (which generally occurs between mid-November and mid-December in Illinois). Apply 100 to 150 pounds of straw per 1,000 square feet (two to four bales), 3 to 4 inches deep over the plants.

Perennial plants also require fall maintenance. Remove any excess growth, and either burn (if legal) or compost the plant material. It may be advantageous to leave some of the stems to catch leaves, which help protect the plants. It is also beneficial to mulch perennials after the ground has frozen. Use something that is loose and does not pack down or stay too wet. Perennials vary in their cultural needs, including winter protection; therefore you may need to research the specific needs of your plants.

Rose preparation. In preparation for winter, prune hybrid teas, floribundas, grandifloras, and polyanthas back slightly if the canes are excessively long in late fall. It is also a good idea to rake up any fallen rose foliage, especially if blackspot was a problem. The plants should be covered after they go dormant. Bushel baskets or commercial covers work well. You need to trim the canes to fit underneath the cover. Mulches that can be used to protect roses include leaves (oak work best), pine needles, straw, old sawdust, or bark chips. The depth of the material should be 12 inches. Soil is not recommended because it stays too wet and packs too much. In the spring, remove the cover or mulch; trim the canes back to healthy wood, just above the strong bud; and thin the plants to four or five canes.

Climbing and rambling rose canes also may need winter protection. Lay the canes on a bed of straw, and cover with more straw. Be sure to cover the crown. Keep the straw in place by tying it or covering it with a small amount of soil. In the spring, remove the covering, remove all damaged wood, and place the canes or shoots back on the trellis.

Winter pruning. The appropriate time to prune depends on the type of plant, its condition, and the results desired. Winter months are a good time to prune many trees and shrubs. Be sure to prune properly; and do not leave stubs, which are susceptible to disease infestation. For more information, consult the University of Illinois publication *Pruning and Care of Trees and Shrubs*, available through Vocational Agriculture Service.

Prune narrow-leaved evergreens in late March, early April, or early June to avoid a spring flush of growth. Midwinter pruning often results in freeze-back of the cut stub, causing loss of additional branches near each cut stub.

Most deciduous trees and shrubs and some vines can be pruned during dormancy. In general, February and March are the best months for winter pruning. This time is also excellent to rejuvenate multistem shrubs that are too large, with too many stems to justify saving any 1- and 2-year growth. During winter pruning, cankers become more visible. Completely remove cankers and discard.

Plants that flower in the spring bloom from buds formed the previous year and, therefore, should not be winter pruned if flower loss is a concern. Summer-flowering plants bloom from buds on the current season's shoots and, therefore, can be winter pruned. Consult plant manuals if you are uncertain of your flowering type.

Miscellaneous items. *Houseplants* that summered out-of-doors should be inside by now. If they aren't, don't delay in bringing them in. Isolate the plants from those already in the house until they are determined to be pest-free. Monitor the watering carefully; they do not require as much water as they did outside. Expect some leaf drop from acclimatization to the lower light levels.

Compost bins should be turned before cold weather sets in, to add air to the pile and encourage decomposition.

Leaf removal should be done in the fall, not only for aesthetic reasons; many leaves house pathogens capable of causing disease the following year. Do not allow leaves to lay on the grass, as damage can occur.

Dispose of leaves through community programs, or use them yourself as mulch or in a compost pile. Check with your local law agency or fire department before burning, as local governments may prohibit open burning, including leaf burning.

In summary, the more work done through the fall and winter, the less spring cleanup required. Be sure to discard properly all plant wastes. Do not remove winter-protective devices too early in the spring. In areas subject to many late, heavy snowstorms and temperature extremes, early mulch removal might be a serious mistake.

For more information, obtain the *Horticulture Fact Sheet* titled "Winter Protection for Woody Plants," #LH179. (Rhonda Ferree and Jim Schmidt)

PLANT DISEASES

Pine Wilt

This disease is caused by a nematode (the pinewood nematode) that is vectored from tree to tree by an insect (the Sawyer beetle). Although we have discussed the disease in issues no. 1 and 14 of this newsletter, pine mortalities from pine wilt were not prevalent until recent weeks.

Watch for flagging (appearance of dead branches) or sudden decline and death of an entire plant within a few weeks or months of initial symptoms. Scotch pines are most commonly affected in Illinois, but the disease can be found on most pines (except white pine). White pine seems to be resistant to this disease; but it has its own problems, as discussed in issue no. 3. Austrian pine is susceptible to pine wilt but is slower to decline, often showing flagging or possibly even tip blight in early stages of the disease.

Given that affected trees generally die so quickly, why have a tree tested for the nematode? The answer concerns disease control. The Sawyer beetle moves the nematode from infected to healthy trees. To break the disease cycle, quick identification and removal of infected trees is important. The wood must be burned, buried, or removed from the site to prevent insect ovipositing and overwintering of the insect in infected wood. At this time, we are still recommending against the use of infected trees as a source of wood-chip mulch. There is some question as to whether or not disease spread can occur from such mulch, especially when it has been composted. If you have a choice, do not use the wood from infected trees as a source of mulch. At this time, we are still unaware of a pesticide that is effective in control of this disease.

Although the Plant Clinic is closed until next May, pine samples to be tested for pinewood nematodes can be sent to N533 Turner Hall, 1102 S. Goodwin, Urbana, IL 61801. Samples will be processed as time from other responsibilities allows. There is still a \$15 fee for the test. For details concerning this pine disease, consult *Report on Plant Diseases*, no. 1104. (Nancy Pataky)

Pumpkin Problems

Rumor has it that pumpkins are not faring well this year due to disease problems. The *Illinois Fruit and Vegetable News*, produced by state specialists working with fruit and vegetables, contained an article in the August 30 issue discussing pumpkin and squash problems. It stated that many pumpkin and squash growers had reported problems with flower abortion and fungal growth on blossoms and small fruit. The authors attributed this to high temperatures, which caused poor bee activity and resulting poor pollination. When inadequate pollination occurs, blossoms abort or produce small fruits that fail to develop and are decomposed by secondary or saprophytic fungi. It is also true that pumpkins do not pollinate well in hot weather. The big problem with pumpkins this year is a result of the extreme heat.

Disease pressure has not been great on pumpkins. The problem is that growers are trying to protect the small crop they have from any disease that may hinder production.

Areas of the state that received heavy rains in late August saw problems with a foliar disease called downy mildew. Chemicals are available to control that disease if used as soon as symptoms occur. Those chemicals also help control the fruit rots that follow in wet weather. Powdery mildew also has been a problem in some areas.

The other pumpkin diseases we saw this year were the cucurbit viruses. Based on the severe leaf distortion on the samples that vegetable pathologist Darin Eastburn observed, the suspect viruses are watermelon mosaic virus, zucchini yellows mosaic virus, or both. Both are vectored by several species of aphids and can cause severe losses, depending on the maturity of the plants at the time of infection. Early infection can cause reduced fruit set and early death of vines. Infection of older plants may cause some leaf distortion and mild distortion on the youngest fruit. Dr. Eastburn states that these viral diseases usually come to Illinois on their aphid vectors shortly after tropical storms in the Gulf of Mexico. This

means that aphid spread of these viruses occurred sometime after the first week of August.

The bottom line is reliable sources are saying the pumpkin crop will be about only 20% of the normal crop in many areas of Illinois. You can count on a high price for pumpkins this year. (*Nancy Pataky*)

Raspberry Cane Blights

Each year, we receive many late-season samples of brambles at the Plant Clinic. Anthracnose, cane blight, and spur blight are the common diseases received.

The preferred method to control these diseases is not chemical. Instead, remove and destroy all fruiting canes as soon as they are done fruiting. Leave the young cane that will bear next year's fruit untouched. This process decreases the amount of future fungal inoculum, as well as opens the planting to better air circulation and more rapid drying.

For more information about these diseases, consult *Report on Plant Diseases*, no. 700 and 709. (*Nancy Pataky*)

BIRDS

Yellow-Bellied Sapsucker

Rows of holes on tree trunks that are about 1/4 inch in diameter are caused by yellow-bellied sapsuckers. These birds attack many species of trees but prefer pines, birches, maples, and apple.

Although woodpeckers feed primarily on insects, yellow-bellied sapsuckers use sap as more than half their diet. They drill a series of holes in either horizontal or vertical rows in tree trunks and eat the sap that runs out. Because they sit vertically on the trunk, these holes are located between branches on the trunk.

Yellow-bellied sapsuckers are larger than starlings but smaller than robins, being almost 8 inches long. They have black-and-white backs and off-white breasts. The yellow belly is evident on only some birds (and in just the right lighting condition). Males have red on the throat and top of the head. Females have little or no red coloration.

These woodpeckers live during the summer in the northern United States and southern Canada, migrating south through Illinois between mid-September and mid-October. They overwinter in the southern United States, migrating north through Illinois between late March and mid-May. These are the only times that trees are damaged in Illinois, although the same bird apparently visits the same tree year after

year. Where the birds spend the summer or winter, they can feed heavily enough on trees to kill them. In Illinois, the damage is noticeable but does not significantly weaken the trees.

Individual trees can be protected by applying tree wrap to the trunks of attacked trees during the time that the birds are migrating through the state. Do not keep the wraps on the trees year-round because increased disease problems can result. The birds are protected by state and federal laws, as well as by an international wildlife pact, so it is unlawful to attack the birds directly. (*Phil Nixon*)

INSECTS

Recapping Insect Activity in 1995

It has been said that predicting insect activity from year to year is like predicting the weather a year in advance, except that it's not as accurate. In hindsight, we may be able to offer speculation as to why some insects were more of a problem this year than in the past, but it is difficult to impossible to know exactly why. Bear this in mind as we offer a recap of the insect activity in 1995. In staying with our weather forecasting, if we haven't a clue why something happened, we'll suggest that it had something to do with el Nino or the greenhouse effect.

The weather was strange in 1995; and, accordingly, so was insect activity in the landscape. One of the more unusual occurrences was spring damage from honeylocust plant bug in the northern counties of the state. This typically innocuous problem north of Interstate 80 developed into a major problem. Many honeylocust trees were so damaged by the infestation in the spring that some homeowners were considering cutting them down because they appeared dead. The majority of the honeylocust trees recovered mid-summer and produced new foliage. The winter weather probably influences many other pests, such as mimosa webworm, that were an observable problem this year. The unusually cool temperatures we are already experiencing and many of the winter predictions suggest we will have a cold winter in 1996. If this is the case, the honeylocust plant bug problems should be less severe next year.

Other weather factors such as moisture may also influence insect populations. In general, we tend to find that some insect pest problems decrease in wet years. This could be caused by many factors, including the availability of insect pathogens. We observed that early season caterpillars appeared to be less of a

problem this year, whereas mid- and late-season caterpillar problems appeared to be normal to above normal. The wet spring, followed by the incredibly hot and dry summer, influenced the plants as well as the pests. Trees (especially conifers) that were drenched for the past couple of years are showing symptoms of drought stress. Trees under stress are much more attractive to boring insects such as bark beetles.

Black locust trees in southern Illinois had problems with both generations of locust leafminer this year. Contributing factors to the increase in this pest could be associated with weather or other factors of natural population regulation.

A couple of exotic beetles were abundant this year. Japanese beetles were certainly on the move in Illinois in 1995. For the last 4 years or so, populations that had remained fairly stable for many years began to increase and spread into previously non-infested areas. Homeowners who hadn't experienced Japanese beetles before were stunned by the damage they could cause to lindens, crabapples, and many other trees. Undoubtedly, the beetles will remain, and (like most of our eastern neighbors) we'll have to accept them as part of the pest complex on woody plants, turfgrass, and herbaceous plantings. Because the Japanese beetles were expanding throughout the state, we received numerous requests for milky spore disease. Milky spore disease, *Bacillus popillae*, is a "biological" control agent of Japanese beetle grubs. We were unable, however, to locate anyone distributing or producing milky spore disease. Reasons for its unavailability are unknown.

The Asian multicolored ladybeetle is still being spotted throughout the state (pun intended). Our campus-based scout indicated that the majority of the ladybird beetles she found feeding on aphids and other pests in the landscape were of this species. Soon after this newsletter is delivered, the beetles should begin congregating on the outsides of buildings and entering homes to overwinter. They are beneficial in that they feed on other insects; however, in severe cases, they can be a nuisance. Caulking cracks and crevices and patching screens on windows should prevent the beetles from entering. Indoor removal can be accomplished mechanically with a vacuum cleaner. (John Lloyd)

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Major authors are Phil Nixon and John Lloyd, (217)333-6650, and Tom Royer, (618)692-9434, entomology; Nancy Pataky, plant pathology, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulture, (217)333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. The editor is Mary Overmier, and the typesetter is Oneda VanDyke, both of Information Services.

INDEX

Horticulture

Deadnettle, purple 3:5
 Fertilization, tree and shrub 17:5
 Henbit 3:5
 Herbicide injury, diagnosing 13:3, 15:6
 Label changes 6:5
 Landscape plants, drought-stressed 19:2
 Ornamentals, winter preparation for 20:2
 Poison ivy 17:5
 Purslane, common 17:6
 Turfgrass, 1995 season 19:1; management for late summer–early fall 19:1
 Weed control, annual grassy, in turf 2:5; aquatic 3:5; broadleaf, in turf 2:6; preemergence, in landscape beds 2:5; postemergence (Roundup, Finale, and Gramoxone) 4:4

Insects

Adelgid, pine bark 3:3
 Aphid, honeysuckle 6:2
 Bagworm 10:2
 Bee, carpenter 8:2
 Beetle, conifer bark 19:5; pine shoot 5:1, 8:2; Japanese 11:2, 12:3, 15:1
 Borer, bronze birch 6:1; iris 3:1; lilac (ash) 3:2; peach tree 5:2; viburnum 6:3
 Cankerworm 4:2
 Caterpillar, eastern tent 1:2, 2:2; walnut 17:2; white-marked tussock moth 14:1; yellownecked 14:1
 Defoliators, late-season 14:1; late summer–early fall 19:4
 Fleas 15:2
 Flies, deer 12:2
 Gall, leaf 9:2; maple bladder 3:2
 Grubs, 2:2, 6:3, 11:2, 12:2, 13:2 (erratum); 16:2, 17:3
 Hickory horned devil 18:2
 Hornets 18:2
 Lady beetle, multicolored Asian 1:2, 16:2
 Leafhopper, potato 8:1
 Leafminer, birch 6:2; elm 5:2; iris borer 3:1; locust 9:2
 Mite, spruce spider 3:1; spider 14:2
 Moth, gypsy, traps 12:1; imperial 18:2; Zimmerman pine 14:3
 Phylloxera, hickory leafstem gall 2:1
 Plant bug, ash 9:1; honeylocust 3:2, 9:1
 Planthoppers 14:1
 Recap, 1995 activity 20:5
 Sawfly, European pine 2:1; white pine 18:2

Scale, cottony maple 10:1; euonymus 9:2; pine needle 4:1; tuliptree 14:3
 Scouting report 2:1, 3:1, 4:1, 5:1, 6:1, 7:1, 8:1, 9:1, 10:1, 11:1, 12:1, 13:2, 15:1, 16:1, 17:2, 18:1
 Scouting techniques 15:3
 Spittlebugs 7:1
 Wasps, tiphiid and scoliid 14:2
 Webworm, fall 16:1; sod 19:4
 Weevil, black vine 11:2; yellow poplar 1:1
 Whitefly, bandedwinged 19:5

Plant Diseases

Anthraxnose, dogwood 6:5; of trees 2:4, 4:3; 5:3
 Black knot of plums and cherries 4:2
 Black spot of elm 14:3
 Blight, Botrytis, of strawberry 7:3; damping-off or seedling 2:4; Diplodia tip 3:4; dogwood flower and leaf 5:4; Dothistoma needle, of pine 1:3; fire 2:3, 10:4; gummy stem, of cucurbits 16:4; Phomopsis, of juniper 5:3; raspberry cane 20:5; Sphaeropsis tip 3:4; tulip fire or Botrytis 5:4; Volutella, of pachysandra 1:3
 Blister, oak leaf 9:4
 Blotch, sooty, of apple 18:4
 Burning bush (euonymus) decline 16:3
 Canker, Cytospora of spruce 9:4; rose cane 15:5; stem, of English ivy 7:4
 Chemical update, Halts 11:3
 Disease, predisposition to 19:3
 Dutch elm disease 9:3
 Elm yellows, or phloem necrosis of 9:3
 Fly speck, of apple 18:4
 Gall, crown 12:4
 Leaf blotch of peony 12:3
 Leaf curl, peach 6:3
 Leaf roll, physiological, of tomato 10:3
 Leaf scorch of trees 12:3
 Leaf spot, bacterial, of English ivy 7:4; of stone fruits 10:3; fungal, of turf 18:3
 Melting out, of turf 18:3
 Mildew, powdery 15:4
 Mold, Sclerotinia white 16:4
 Oak problems 19:3
 Phomopsis, of juniper 5:3
 Plum pockets 6:3
 Pumpkin problems 20:4
 Raspberry disorder 19:3
 Rose rosette disease 16:3
 Rot, black, of strawberry 7:3; blossom-end 17:1; brown, of stone fruit 12:2; Phytophthora root, of rhododendron and azalea 8:4; root, of bedding plants 11:3; wood, and decline of trees 18:3

tering scale insects, mites, mite eggs, and aphid eggs. They are applied when the target insect is most vulnerable and the host plant is least exposed.

Horticultural oils kill insects, insect eggs, mites, and mite eggs by contact, but only if they are exposed at the time of application. Oils kill immatures and adults mainly by suffocation as a result of blocking the spiracles (openings through which insect receive oxygen)—resulting in a reduction of oxygen and preventing the exchange of gases for metabolic activity. Death usually occurs within 24 hours. Oils also kill insect eggs by suffocation and can interfere with embryonic development by penetrating the egg membrane.

When dormant oils are used, certain guidelines must be followed in order to insure effective pest control and to prevent plant injury:

- When a spray oil is selected, the unsulfonated residue (UR) rating (level of purity) should be 92 percent or greater and the distillation (boiling) midpoint should be 412 to 440°F (see Table 1).
- Oils should not be applied if temperatures are below 40°F because of freezing and the potential for excessive oil deposition.
- Apply the oil according to label rates. Do not overapply. Oils, if improperly applied during the dormant season, can cause terminal and/or branch dieback, which may be apparent in the spring.
- Do not spray when buds are fully opened and shoot elongation is occurring. Take into consideration plant genetic make-up and variability.
- Finally, and probably most important, be aware and alert to plants that are sensitive to oil sprays. Be sure to read the label for specific plant species and varieties. *If in doubt, do not spray!* For example, do not spray Colorado blue spruce with oil as it will remove the glaucous (blue) bloom. If you ex-

periment on several plants, be sure to make notes on weather conditions, plant variety and/or species, and application rate. Table 2 shows a partial listing of oil-sensitive plants and plants with a tendency toward sensitivity.

Table 2. Plants Sensitive to Horticultural Oils

Oil-sensitive plants		Tendency toward sensitivity	
Maples	dormant	Beech	dormant
Hickories	dormant	Japanese holly	dormant/ summer
Black walnut	anytime	Redbud	dormant
Cryptomeria	anytime	Savin junipers	summer
Smoketree	summer	<i>Photinia</i> sp.	summer
Azaleas (limited)	summer	Spruce	dormant
		Douglas-fir	dormant

Source: W. T. Johnson, "Horticulture Oil." *J. of Environmental Horticulture* 3:(1985) 188–191.

There are several advantages of horticulture oils:

- Oils are very safe environmentally and are degradable by evaporation.
- Oils quickly dissipate by evaporation shortly after application, with little pesticide residue left behind.
- Oils are compatible with an IPM program and are less harmful to nontarget organisms.
- Oils are virtually nonpoisonous to the applicator.
- Oils are noncorrosive to spray equipment.
- Oils can provide a wide range of pest control without plant injury. (*Fredric Miller, (708)352-0109*)

PLANT DISEASES

Plant Clinic Opens May 1

The University of Illinois Plant Clinic will once again open its doors for service on Wednesday, May 1. The clinic is an integrated plant lab where diagnosis of about 2,600 plant samples is handled annually. Services include plant and insect identification; diagnosis of disease; insect, weed, and chemical injury; nematode assays; and help with nutrient-related problems—as well as recommendations involving these diagnoses. Specialists are consulted, as needed, in the areas of botany, entomology, forestry, horticulture, mycology, plant pathology, soils, soil fertility, and weed science.

The clinic, located on the University's South Farms, has a mailing address of Plant Clinic, 1401 W.

Table 1. Uses and Dosages for Horticultural Oils

Distillation temperature	Primary use	Dosage per 100 gallons
412°F	summer	2–3 gallons
435°F	summer/dormant	2 gallons for summer 4 gallons for dormant
438°F	dormant	2–3 gallons

Source: W. T. Johnson, "Horticulture Oil." *J. of Environmental Horticulture* 3:(1985) 188–191.

St. Mary's Rd., Urbana, IL 61801. Hours of operation are 8 to 12 and 1 to 4:30, Monday to Friday. Do not send samples before May 1 because there will be no one to diagnose the samples and the mailing address will not be receiving samples until that date.

There is a fee for all plant samples, regardless of origin. It is always best to seek help from the local Cooperative Extension Service office first. Educators may be able to answer questions without your having to send a plant sample. Still, anyone may submit a sample directly to the clinic. Fees must accompany the sample and are as follows:

\$10	Regular sample, including culturing if necessary
\$15	Pinewood nematode, soybean cyst nematode, or specialized virus tests
\$30	Corn nematode testing

The clinic is not equipped to handle pesticide-residue tests or nutrient analyses. The lab is set up to do microscopic work and culturing for pathogens, and to seek multidisciplinary help in diagnosis. Control recommendations are suggested.

The quality of the diagnosis is often directly related to the background information provided. Specimen data forms are available at your local Cooperative Extension Service office or from the Plant Clinic at (217)333-0519. A data form or equivalent background information should accompany each sample. Include details concerning field or plant symptoms, past chemical applications and rates, pattern of symptom development, cultural practices, suspected problems, and any other information you believe may help with the diagnosis.

Proper packaging of plant specimens can help ensure accurate diagnosis. Leaf material generally should be placed between cardboard to remain flat and dry. Whole plants should be packaged as though ready for transplanting. Wrap soil and roots in plastic, seal at the stem, and allow tops to remain out of the plastic. Fleshy plant material should be loosely wrapped in newspaper. When in doubt, call the clinic and ask for packaging suggestions. (*Nancy Pataky*)

Disease Prevention through Sanitation

If you have not already done so, check all of your trees, shrubs, and bush and cane fruits, plus your vegetable and flower gardens. Last year's plant debris—leaves, stems, and fruits—should be collected and burned (where possible), buried, or hauled away with the trash. All diseased, dead, dying, broken,

crossing, or rubbing branches should be removed to improve appearance, prevent spread of disease-producing organisms (pathogens), and improve air circulation. Remove weaker, crowded, and rubbing branches while they are young; and remove dead, dying, and cankered branches as soon as you discover them. Composting diseased plant tissue, especially woody material, is not advised.

For fruit trees, remove all side branches except those desired for permanent limbs. Prune fruit trees to open up the centers, space fruiting wood, control height, and make sprays easier to apply. Judicious pruning results in more vigorous plants, larger blooms, and more fruit—and also controls plant size and shape. Prune in dry weather to avoid spreading disease-causing fungi and bacteria.

Do not prune oaks during the growing season (now to September or later), or you may invite infection by the oak-wilt fungus. Sap-feeding beetles, which transmit the oak-wilt fungus, are attracted to fresh pruning wounds when the sap is flowing in trees. Avoid any kind of wound to oaks during the growing season. We have confirmed oak wilt as far south as Marion in Illinois. (*Nancy Pataky*)

HORTICULTURE

Ethephon for Nuisance Fruit Removal

Over the past year, we have received many calls about ethephon to control "nuisance fruits." A foliar spray of ethephon is used to reduce or eliminate undesirable fruit development on many ornamental trees and shrubs such as crabapple, cottonwood, elm, ornamental pear, maple, oak, pine, sweetgum, and sycamore.

Although several chemicals are available to eliminate nuisance fruit, ethephon is the most commonly used and readily available. Ethephon is available from several formulators as different trade names, including Florel and Ethrel. Ethephon eliminates much of the fruit, but it does not affect leaf growth and color or the turfgrass or other woody plants around the trees that may have captured drift from the application. Ethephon eliminates the fruit without causing premature flower drop and thus interrupting spring flower show.

As with all chemicals, check the pesticide label carefully. The key to success with fruit removers is timing. The application must be made during flowering, but before fruit set, in spray volumes sufficient to wet but not to run off. For most flowering trees there

is a 10-day to 2-week window in which to make the application. Sweet gums are a little tricky because the flowers are not showy; however, arborists have found that sprays are effective just as new leaves begin to emerge.

Upon entering the plant, ethephon breaks down to ethylene, a naturally occurring plant hormone. Ethylene production within the plant is stimulated by stress. For this reason it is important that plants being treated are not under stress from drought, high temperature, disease, or other environmental conditions. Treating stressed plants can cause severe injury to the plant such as defoliation or leaf scorching. (*Rhonda Ferree*)

Spring Cleanup and Preparation Tips

This has been a long, cold winter; but spring is just around the corner. Regardless of the amount of cleanup you did last fall, some spring cleanup, pruning, and preparation are needed.

Pruning Raspberries: Spring pruning of red and yellow raspberries should be done before the buds begin to swell. All short and weak canes should be removed and the vigorous canes thinned so they are 4 to 8 inches apart. Only the largest canes should be saved. Cut the canes back to 3 or 4 feet. The canes of everbearing varieties should be topped back if they were not pruned after last fall's harvest.

Strawberries: On mulched strawberries, remove part of the straw as the new growth starts. Remove the excess and leave some of the straw between the rows. Do not fertilize until after harvest is complete and the patch is renewed.

Blueberries: Blueberry plants should be pruned before the new growth begins. Remove dead or injured branches as well as any short, stubby branches near the ground. It is important to remove some of the older branches to allow younger, vigorous branches to develop. If the plants have an unusual load of fruit buds, the tips of the branches can be cut back to 4 to 6 fruit buds. The fruit buds are large, round, and plump; the leaf buds are smaller, thinner, and sharply pointed. Cutting the fruiting branches reduces yields slightly, but the berries will be larger.

Roses: Remove the covering (soil, leaves, cones) on roses that were protected for the winter. Clean up the rose beds by removing any leaves and debris that could carry disease from one season to the next. While the plants are dormant and the weather has

moderated, prune them to improve health, appearance, and productivity. Begin by removing all wood that is dead, damaged, and blackened. Cut down to healthy wood, just above a leaf bud. Remove any crossing branches, twiggy growth, or side growth. Take out old wood at the bud union and leave 3 to 5 canes evenly distributed. Do not mulch at this time; a mulch will keep the soil cool and slow the growth of the bushes.

Perennial Flowers: This is also the time to carefully remove any mulch that was placed around perennials to protect them. Don't be alarmed if no new growth is evident; many plants are slow to emerge in the spring. Unprotected plants or those sensitive to temperature extremes may have damage to the crowns or the plants may have "heaved" from alternate freezing and thawing. Before removing any plants, wait for temperatures to warm to see if any growth appears.

Woody Ornamental Winter Injury: Some plants are showing winter injury, particularly evergreens. Use a wait-and-see approach. Regardless of the amount of injury showing, most plants have viable buds. Do not prune back material until the buds start to grow. Once new growth appears, prune dead material back to the new growth, bud, or a branch.

Preemergence Herbicide Applications: Wait to apply any preemergence herbicides until soil temperatures are 55°F. (*Jim Schmidt and Rhonda Ferree*)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ▲ illinois natural history survey, champaign

NEWSLETTER

No. 2 • April 24, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Apple Scab Already?

Each year we describe symptoms of apple scab and discuss the reasons that spraying after symptom development is not effective. Last year was probably the most severe infection of apple scab that we have seen in the past 20 years, especially in the northern and central parts of the state. It was so serious (tree defoliation by mid-June) that many Chicago growers doubted our diagnosis and sent samples to other labs for second opinions. The infection level of 1995 means that there is considerable inoculum in Illinois this year.

The scab fungus overwinters on fallen leaves that were infected the previous season. Initial infections occur from spores that are produced in early spring about the time green tissue first emerges (now). The dispersal of these spores may continue for as long as 2 to 4 weeks after petal fall and is called the primary infection period. Lesions from initial infections then produce their own spores, and secondary infections occur through June and July. Many commercial crabapple growers have found that using chemicals to protect against the primary infection period will control most of the disease problem.

The severity of scab is determined by the temperature and the frequency and duration of early season rainfall. Since scab was a problem last year, if we experience frequent rainfalls this spring, scab will be a problem again in 1996. If fungicides are chosen as a

means of disease control, keep in mind that most of the fungicides available are protectants (provide protection from new infections). Only a few have curative properties (benzimidazoles—24 hours, sterol inhibitors—96 hours). Some commercial applicators use a combination of a protectant and a curative fungicide. Regardless, fungicides must be initiated as new growth first appears and repeated at 7- to 10- day intervals according to label directions. Chemical options are listed on page 79 of the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Seedling Damping-Off

All species of plants grown from seed are susceptible to one or more soilborne fungi capable of causing damping-off of seedlings. Entire flats of annuals, perennials, or vegetable plants can be lost to damping-off. Plants wilt and die suddenly, sometimes even before emerging from the soil. If you carefully dig into the soil, you will find rotted seeds or seedlings—indicating that a damping-off disease has infected the plants.

Damping-off is most often associated with the fungus *Rhizoctonia solani* and species of *Pythium*, but many other fungi may also be involved. These fungi are more of a problem in cool, wet, poorly prepared seedbeds or in conditions where seed remains in the soil for an extended time before germinating. Poor quality seed is more likely to be affected by these fungi.

Many of us are in a hurry to get seed planted with the first warm days of spring. Keep in mind that conditions have to stay warm long enough for the seed to germinate and for plants to emerge from the ground before it is safe to plant. Of course, late frosts may then take their toll. The seed that remains in cool, wet soils for several days is likely to become infected with damping-off fungi. A protectant chemical seed treatment can help the seed survive these fungi until emergence from the soil. Such treatments may also be



helpful on lower-quality seed. Nothing will guarantee safe emergence, however; so high-quality seed placed in a warm, well-prepared seedbed is recommended. Chemical seed treatments available for use on most ornamentals include captan, metalaxyl (Subdue), etridiazole (Truban or Terrazole), Banrot, or iprodione (Chipco 26019). Be certain to check labels for application rates and for chemical registration for the intended crop. Also, chemicals such as captan are used to protect against a wide range of fungi, whereas others such as metalaxyl will control only the water-mold fungi. If you have had a recurring problem with damping-off, you should contact your Cooperative Extension Service office for help in deciding which product to use. Consult the *1996 Illinois Urban Pest Management Handbook* for recommendations by host plant. (Nancy Pataky)

Snow Molds of Turfgrasses

Snow molds are cold-tolerant fungi that grow at freezing or near-freezing temperatures. They may damage turf from late fall to spring. Snow molds may injure turf at snow melt or during cold, drizzly periods when snow is absent. Both of these environmental conditions have occurred this season. The good news is that once the grass surface dries out and the temperatures increase, snow mold fungi cease to attack.

Look for these diseases where there are conditions of excessive shade, thick thatch, heavy mulch, or other moisture-holding debris on the turf. Disease is most serious when air movement and soil drainage are poor and the grass stays wet for long periods, for example, where snow is deposited in drifts or piles.

Both gray snow mold and pink snow mold occur in Illinois. Gray snow mold appears as roughly circular, white to grayish white areas that coalesce to form areas up to 2 to 3 feet in diameter. A grayish white mold may be seen on the affected area, especially when it is wet. This mold eventually turns black. At other times a silvery crust forms over the affected turf. Pink snow mold patches are usually more rounded and smaller than those of gray snow mold, and are often pink after exposure to light. The spots may enlarge up to 8 or 12 inches across or merge to cover large areas.

What can you do about snow mold injury? Rake up the matted grass now and reseed or resod as necessary using resistant varieties. Snow molds tend to occur in the same spots each year, so for long-term control, practice the cultural control recommendations in *Report on Plant Diseases* No. 404, "Snow Molds of

Turfgrasses." These practices help to establish a site that is not conducive to the fungal pathogens. In areas repeatedly infected, a fungicide may be applied to prevent a future problem. An application is made before the first heavy snow or before cold, drizzly weather is forecast in November or early December. (Registered fungicides are listed in the *1996 Illinois Urban Pest Management Handbook*.) This option is more common for commercial growers or golf course superintendents. (Nancy Pataky)

HORTICULTURE

Salt Damage to Landscape Plants

Nineteen ninety-six might be called the year of the red pines. The needles of many species of evergreens, particularly white pines, are now displaying reddish brown needles. This is the classic symptom shown by evergreens as a result of airborne salt sprays coming from the salt applied to treat icy roadways. Once airborne, salt aerosols can travel several hundred feet from the highway depending upon the direction and speed of the wind. The deicing salt that is deposited on the stems and leaves of landscape plants contains the chloride ion which is toxic to a wide range of plant materials including both evergreen and deciduous species. The injury symptoms usually appear more severe on the side of the plant facing the highway. This year entire discoloration of plants is being noticed. This is due to increased application of deicing salts combined with the fact that last summer was extremely dry, followed by a dry fall and winter resulting in increased winter desiccation.

The chloride ion is toxic to the buds and stem tissues of plants—causing dieback of deciduous plants that is often not noticed until after bud break. Although there is a difference in the sensitivity of plants to salt injury, most of the genera used in the landscape can be affected. These include Acer (maple), Cornus (dogwood), Forsythia, Juniperus (junipers), Picea (spruce), Pinus (pines), Prunus (cherries, plums), Syringa (lilac), and Taxus (yew). In addition to the toxic effect of the chloride ion, salts that accumulate on the surfaces of plants can cause water to exit plant tissues exacerbating the needle, stem and bud drying.

Salts can also build up in soil to a level that will damage plants. Soil build-up is due to concentrated runoff of the deicing salts. Toxic ions can accumulate in root tissues. The most common effect of high salt

TREE AND SHRUB PESTS I



1. Succulent oak gall



2. Cooley spruce gall



3. Honeysuckle aphid



4. Japanese beetle



5. Ash borer



6. Willow leaf beetle



7. Periodical cicada



8. Tussock moth



9. Oak leaf miner



10. Fall webworm



11. Mimosa webworm



12. Gypsy moth



13. Obscure scale



14. Winged scale

TREE AND SHRUB PESTS I

Succulent Oak Galls appear as marble-sized, green balls on oak, particularly pin oak, in the spring as the leaves are expanding. These growths are caused by a tiny wasp that develops inside the gall. Although the tree uses energy to produce the gall, the gall's presence does not appear to harm the tree. Controls are usually not needed.

Cooley Spruce Galls are caused by adelgids (a type of insect) on twig tips of spruce. They reproduce inside the gall during the summer, and escape in late summer when the gall splits. They lay their overwintering eggs on spruce or Douglasfir. Galls do not form on Douglasfir, but look like fuzzy aphids on the needles and may be controlled anytime during the growing season. While in the gall on spruce, insects can only be controlled by pruning out the galls. Insecticide control on spruce should be timed for early fall or early spring when the spruce buds are breaking.

Honeysuckle Aphids cause witches'-broom on Zabel's and Russian tatarian honeysuckles during the summer. Their eggs overwinter in the witches'-broom, so removal of the brooms during the winter will reduce their numbers the following spring. Chemical controls are not usually needed until June, when aphid numbers become large enough to cause leaf-fold and witches'-broom.

Japanese Beetle adults emerge from turf areas in late June and feed until about mid-August on the leaves, blossoms, and fruit of smartweed, rose, raspberry, and many other plants. They lay their eggs in turf, and the resulting grubs feed on plant roots until winter. The grubs resume feeding in the spring, then pupate, and emerge later as ½-inch-long adults.

Ash Borer is also known as **Lilac Borer** because it attacks lilac as well as ash. The adult moths start emerging in mid-June and bore ¼-inch-diameter holes in the trunk, and lay eggs in old bore holes, pruning wounds, and other wounds the following months. These eggs hatch into larvae that burrow into the trunk and eventually girdling the tree.

Willow Leaf Beetle is a dark blue, metallic-colored, ½-inch-long beetle that overwinters under loose bark and in other protected areas. After eating holes in willow leaves in spring, they lay eggs that hatch into black larvae. The larvae also feed on willow leaves, causing brown areas. The larvae pupate at the base of the tree, emerging as adult beetles that continue feeding on the leaves. There are several generations per year.

Periodical Cicadas spend either 13 or 17 years (depending on the brood) feeding as nymphs on the roots of trees and shrubs. The mature nymphs emerge from the soil, leaving ½-inch-diameter holes. They climb trees and shrubs where the nymph emerges, leaving behind the brown nymphal shell. After emerging, the females insert their eggs into slits cut into small twigs. This weakens the twigs, causing many of them to die and break off later in the year. The eggs hatch soon after they are laid and the young nymphs burrow into the soil to feed for 13 or 17 years.

Tussock Moth caterpillars feed on the leaves of oak and other trees during June and early July. When fully grown, they

migrate to the trunk and branches, forming cocoons in bark crevices. Moths emerge from the cocoons a few days later, mate, and lay their eggs in dirty white clusters in the bark crevices. In August, a second generation of caterpillars emerges, whose moths lay overwintering eggs in bark crevices and under loose bark.

9. **Oak Leaf Miner** caterpillars feed on leaf tissue between the upper and lower surfaces of bur oak and other oak leaves, causing brown patches on the leaves. When fully grown, the caterpillars pupate in the mined leaves and then emerge as moths that mate and lay eggs on other oak leaves. The hatching caterpillars burrow into the leaves, creating more mines. Control is usually not needed since damage does not become severe until early fall, shortly before leaf drop.

10. **Fall Webworm** feeds on many kinds of deciduous trees, preferring black walnut and crabapple. The caterpillars spin silk tents over the ends of the branches, and feed on the leaves inside the tents. Although there may be two generations per year, they are most numerous and noticeable in late summer. Since damage occurs late in the summer, fall webworm is usually not very harmful to the trees. Control by pruning out the tents or spraying forcefully with insecticide. When mature, the caterpillars drop to the ground to overwinter as pupae.

11. **Mimosa Webworm** has two generations per year, one in July and another in late August. Since the August generation tends to be much larger and causes more damage than the July generation, control decisions should be made in July to escape heavy August damage. Overwintering pupae can be found in protected areas such as underneath tree bark and house siding. Moths emerge to lay eggs the following summer.

12. **Gypsy Moth** caterpillars feed on most kinds of trees, but prefer oaks. The caterpillars do not form a silk tent and are present only in the spring. They pupate in early summer, emerging as adult moths in midsummer. Male moths are attracted to female moths by a compound called pheromone. A similar compound is used to bait traps and capture male moths. Gypsy moth infestations are monitored using these moth capture data. Eggs are laid in buff-colored clusters that are about ½ inch wide by 1 inch long. These egg clusters are laid under loose bark and in other protected areas where they overwinter.

13. **Obscure Scale** is well named due to its gray color blending in with the bark of the oaks and other trees that it attacks. This scale has one generation per year, but crawlers hatch from its eggs throughout much of the summer. Crawler sprays are not feasible due to this prolonged hatching period. Dormant oil sprays are used for control.

14. **Winged Euonymus Scales** overwinter as immature females, which mature in the spring. Eggs are laid in early June; these hatch and mature through the summer to lay eggs for a second generation in late July. Control with insecticide treatments in June and August, when the newly hatched crawlers are active.

TREE DISEASES II



1. Hawthorn rust



2. Quince rust



3. Cedar-apple rust



4. Juniper rust



5. White pine blister rust



6. Eastern gall rust of pine



7. Phloem necrosis of elm



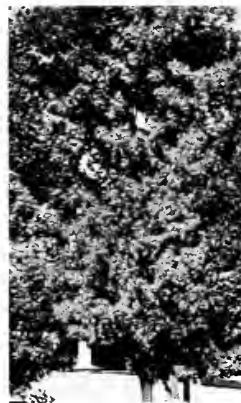
8. Dutch elm disease



9. Wetwood of elm



10. Oak wilt



11. Verticillium wilt of maple



12. Mimosa wilt



13. Fire blight of hawthorn



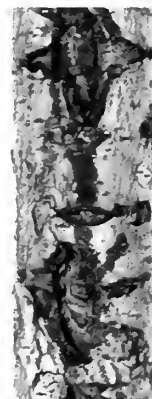
14. Willow black canker



15. Phomopsis canker of Russian olive



16. Bleeding necrosis of sweet gum



17. Sunscald and black rot of mountain-ash

TREE DISEASES II

Hawthorn Rust is caused by the fungus *Gymnosporangium globosum*. Yellow to orange spots form on the upper leaf surface while the lower surface shows orange to brownish spots containing tubelike appendages developing on the corresponding under surface. Other pomaceous hosts include apple and crabapple, mountain-ash, and pear. Alternate hosts of the fungus are species of juniper (see No. 4 below). The fungus overwinters in small brownish galls on juniper.

Quince Rust is caused by the fungus *Gymnosporangium clavipes*. Hawthorn twigs and fruit are swollen, distorted, and covered with whitish orange, tubelike appendages filled with masses of orange spores. Other pomaceous hosts include apple and crabapple, Japanese quince, mountain-ash, pear, and quince. The fungus overseasons on species of juniper (see No. 4 below).

Cedar-Apple Rust, caused by the fungus *Gymnosporangium iperiperi-virginianae*, infects numerous junipers. Apple and crabapple are alternate hosts. Juniper twigs are stimulated to form small, greenish brown, globular galls. The slowly enlarging galls, by the second spring after infection, are up to 2 inches in diameter. Older galls (or "cedar apples") are chocolate-brown, globular to kidney-shaped, and corky. Small, pitlike depressions form on the gall surface. Orange, gelatinous, hornlike spore-horns (up to 100 per gall) protrude up to 2 inches from the circular depressions during spring rains. During dry periods the spore-horns wither into wrinkled threads. The galls later dry, shrivel, and turn black.

Juniper Rust. Several juniper species, especially red cedar, are affected by 3 common rusts: cedar-apple, cedar-hawthorn, and cedar-quince. Quince rust appears as slight swellings, somewhat spindle-shaped, on twigs, branches and trunk. The fungus is perennial in the living bark. Hawthorn rust (1) galls are similar to those of apple rust (3), but are seldom over ½ inch and produce only a few gelatinous spore-horns. Cedar-hawthorn and cedar-apple rust galls produce spore-horns for only one season.

White Pine Blister Rust, caused by the fungus *Cronartium ribicola*, attacks 5-needle pines. The fungus invades and kills the needles before moving into twigs and branches. Swollen, oval, yellowish cankers slowly enlarge, girdle, and kill stems. Killing of pines progresses from small to larger branches and into the trunk. Several years after the needles were infected, the cankered bark produces whitish yellow blisters filled with masses of orange-yellow spores. The spores are carried by the wind to infect leaves of certain currants and gooseberries, alternate hosts.

Eastern Gall Rust of Pine, caused by *Cronartium quercuum*, attacks numerous pines forming roundish galls on the stems. Alternate hosts include oaks and chestnuts. In spring, yellow fruiting bodies, covered with dusty spores, break through the pine bark in a brainlike arrangement. The fungus overseasons in pine stems.

Phloem Necrosis of Elm, caused by a mycoplasma-like organism, is widespread and destructive. Elm leaves curl upward at the margins, turn yellow or brown and drop. The disease can be confused with Dutch elm disease (8) and other elm wilts. A reliable symptom is a waterscotch yellow color of the inner bark, often flecked with brown black when freshly cut, plus a wintergreen odor. Transmission is by the white-banded elm leafhopper (*Scaphoides luteolus*).

Dutch Elm Disease, caused by the fungus *Ceratocystis ulmi*, is the most destructive shade tree disease. All American and European elms are susceptible. Leaves on the tips of one or more branches wilt, curl, and turn yellow or brown ("flag"). Many elms show progressive wilting, discoloration, and dropping of leaves on additional branches until the tree dies in several weeks to a year or more. Dark brown or black cankers develop in the sapwood (other wilts show similar streaking). Bark beetles (*Scolytus multistriatus* and *Hylurgopinus rufipes*) feed in dead and dying elm wood. The beetles transmit the fungus when they feed in twig crotches of nearby healthy elms. Transmission from diseased to healthy elms also occurs via root grafts.

9. Wetwood of Elm is cosmopolitan and caused by a bacterium. Invaded spring wood and heartwood becomes water-soaked and dark brown. Fermented sap under pressure (up to 60 psi) in diseased wood is forced out through cracks, branch crotches and wounds. The dark flux flows down the trunk or branches and dries to a grayish white incrustation. Affected elms often show yellowing, scorching, wilting, and dropping of leaves. Branches may die back and the tree shows a general decline.

10. Oak Wilt, caused by the fungus *Ceratocystis fagacearum*, is widespread, serious, and affects all species of oak. Leaves in the crown of red and black oaks turn dull pale green then yellow to bronze or tan (starting at the margins), curl upward, and drop. Symptoms progress downward and inward throughout the tree. Mature leaves are usually stiff before dropping; immature leaves curl, droop, turn dark brown to black, and remain attached. Leaves on wilting bur and white oaks usually turn light brown or straw-colored, curl, and remain attached. Red and black oaks commonly wilt and die in 4 to 6 weeks; white and bur oaks usually die slowly ("staghead") over a period of years. Transmission is from diseased to healthy oaks via root grafts and over longer distances by feeding of sap-feeding insects in fresh wounds.

11. Verticillium Wilt of Maple, and 300 other species of woody and nonwoody plants, is caused by the fungus *Verticillium albo-atrum* (*V. dahliae*). Maple leaves usually wilt and turn brown suddenly in summer on a few branches, on whole sections, or the entire tree. The sapwood may show greenish streaks. The soil-inhabiting fungus invades through wounds in roots and stems.

12. Mimosa Wilt is caused by the fungus *Fusarium oxysporum* f. *peniculosum*. Leaves on certain branches wilt, turn yellow, hang down, die, and drop. Brown to black streaks form in the sapwood. The soil-borne fungus enters through the roots. Nematode feeding may increase the incidence of wilt.

13. Fire Blight of Hawthorn is caused by the bacterium *Erwinia amylovora*. Other hosts include apple and crabapple, amelanchier, cotoneaster, mountain-ash, photinia, pyracantha, quinces, and spirea. The blossoms, leaves and twigs suddenly wilt and appear scorched by fire. Affected twigs and small branches die. The bacterium overwinters in living tissue at the edge of discolored, slightly sunken cankers (with marginal cracks) on the branches and trunk.

14. Willow Black Canker is caused by the fungus *Physalospora miyabeana*. The fungus proceeds from leaves (which curl and wither) through the petioles into twigs and larger branches where conspicuous, girdling black cankers are formed—followed by defoliation. The fungus produces pinkish spore masses on dead twig and branch cankers.

15. Phomopsis Canker of Russian Olive, caused by the fungus *Phomopsis elaeagni*, is common and serious in the Midwest. Oval to elongate, depressed, reddish brown cankers with smooth bark form on the branches and trunk. Cracks often form around the margins. Girdled parts wilt and die. The withered leaves remain attached for some time.

16. Bleeding Necrosis of Sweet Gum, caused by the fungus *Botryosphaeria dothidea*, induces profuse bleeding from younger branch and trunk cankers and emits an unpleasant, sweet odor. Bleeding areas are connected internally to reddish brown sapwood. Weakened trees may produce numerous sprouts along the branches. When severe, trees exhibit branch dieback and later a general decline. The disease occurs mainly on stressed trees.

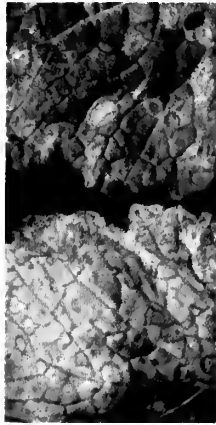
17. Sunscald and Black Rot of Mountain-ash. The south side of densely shaded trees, when suddenly exposed to intense sun, often develop summer sunscald (cankers) that kills the bark. The black rot fungus, *Physalospora obtusa*, commonly invades the dead bark. Numerous, raised, black, fungus-fruited bodies form in the cankers.

For cultural and chemical control suggestions, and other control measures, consult the Extension Plant Pathologist at your land-grant university, or your county extension office.

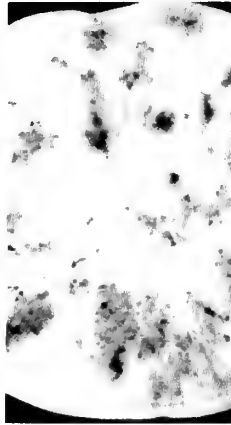
VEGETABLE DISEASES II



1. Alternaria leaf spot of cabbage



2. Cercospora leaf spot of turnip



3. Downy mildew of turnip



4. Downy mildew of kale



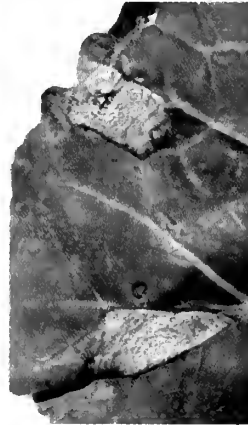
5. Cabbage downy mildew



6. Clubroot of cabbage



7. Wirestem and Rhizoctonia head rot (bottom rot) of cabbage



8. Cabbage blackleg



9. Cabbage black rot



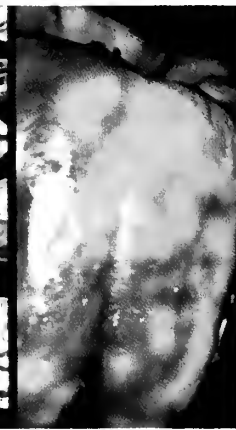
10. Rhizoctonia stem rot of potato



11. Phomopsis blight of eggplant



12. Pepper mosaic



13. Aster yellows of carrot



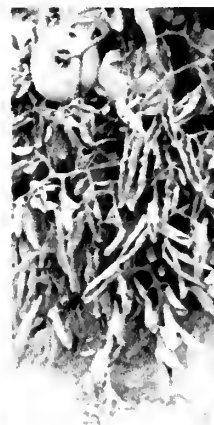
14. Beet cyst nematode



15. Tomato root knot



16. Tomato blossom-end rot



17. Physiological leaf roll of tomato



18. Potato leaf roll



19. Pepper physiological leaf roll

VEGETABLE DISEASES II

Alternaria leaf spot of cabbage, caused by the fungus *Alternaria brassicae*, is easily identified by distinctive circular, yellowish to brown spots with concentric circles beginning on lower leaves. During storage, numerous spots may develop over the entire head. Soft rot may follow. The fungus overwinters in crucifer refuse and seed. Spread as spores by wind, rain-splash, on tools, and feet.

Cercospora leaf spot of turnip, is caused by several species of the genus *Cercospora*. Circular to angular, pale green to yellow, tan, gray, or white spots, usually with a brown border, form in leaves. Overwintering is in volunteer plants, perennial weeds, and possibly in seeds. Spores (conidia) of the fungus are spread by wind, rain-splash, and clinging plants.

Downy mildew of turnip, is caused by the fungus *Peronospora brassicae*. Fleshy roots may be brown or black, or show a net-necrosis that extends from the root crown downward or begins on the side at the crown level. Skin may be roughened by minute cracks or the root may be open. Infected tissue is firm unless invaded by decay organisms. The fungus survives in perennial plants or winter annuals and plant refuse. Spread occurs mainly by wind-borne spores during damp weather.

Downy mildew of kale is caused by a strain of the fungus that attacks turnip. Leaf lesions are light green, then pale yellow to tan and gray. When moist, a sparse white mold forms mostly on the underleaf surface. Whole leaves may die. The fungus overwinters on seed, on crucifer weeds, and possibly in soil.

Cabbage downy mildew, caused by strains of *Peronospora parasitica*, produces symptoms as those for kale. Numerous, sunken black spots, from speck size to an inch or more in diameter, may form on heads. Overwintering and spread is the same as for turnip and kale.

Clubroot of cabbage and other crucifers is caused by the fungus *Plasmodiophora brassicae*. Plants are stunted and may show nutrient deficiency symptoms. Wilting during bright, hot days followed by recovery at night is common. The root system is distorted into a mass of small to large, spindle-like or club-shaped swellings. Overwintering occurs in soil and diseased roots. Decomposing roots release resting spores capable of surviving for years until a host crop is grown. Spores are spread by any agency that moves infested soil or soil water; long-distance spread is by infected transplants.

Wirestem and Rhizoctonia head rot (bottom rot) of cabbage is caused by the fungus *Rhizoctonia solani*. Stems are shrunk, darkened, and girdled near the soil line. Plants are weak, produce small heads, sometimes wilt and die. Bottom rot develops after transplanting when the plant is slightly sunken spots develop on basal leaves. When moist, and in storage, rot spreads to adjacent leaves causing a dark head rot. The fungus occurs in all field soils and spreads in infected transplants.

Cabbage blackleg, caused by the fungus *Phoma lingam*, infects all crucifers. A sunken, light-brown canker near the ground girdles the stem causing wilting. Roughly circular, light-brown spots form on leaves, seed stalks, and seed pods. Numerous black specks (pycnidia) appear in older lesions. The fungus overwinters in and on seed, plant refuse, and soil for 2 to 3 years and spreads by splashing or flowing water, on tools, by handling plants and infested manure.

Cabbage black rot, caused by the bacterium *Xanthomonas campestris* pv. *campestris*, infects many crucifers. Yellow then brown, elongated blotches with blackened veins form near margins of leaves. Severely infected plants may die. Late infection causes yellowing and wilting of the entire plant. When cut, stems show a black vascular ring. Overwintering occurs on and in seed or plant refuse in soil for 1 to 2 years. Spread occurs through drainage water, splashing rain, wind, farm implements, handling plants, and insects.

Rhizoctonia stem rot of potato (black scurf of tubers), caused by the fungus *Rhizoctonia solani*, occurs generally. Brown sunken lesions (cankers) on sprouts, stems, stolons, and roots may kill the part(s) affected. Sprouts that emerge lack vigor and produce thick, dark green scabs that may roll upward and turn pinkish to purplish. The stalks bear small aerial tubers. Underground tubers form in tight clusters and are small, numerous, and misshapen. Small, hard, dark brown or black sclerotia are very common on tubers ("the dirt that won't wash

off"). The fungus lives indefinitely in soil and is carried on seed tubers and by any agency that moves infested soil.

11. Phomopsis blight of eggplant, caused by the fungus *Phomopsis (Diaporthe) vexans*, occurs generally. Seedlings rot. Leaf spots are circular and gray to brown with light centers. Leaves later yellow and die. Sunken cankers form on the stem base. Enlarging fruit lesions are pale brown, sunken, and marked concentrically by numerous black pycnidia that contain spores. (Pycnidia also form in other affected parts.) Fruit develop a soft rot or shrivel into black mummies. The fungus overwinters in or on seed, plant refuse, and contaminated soil. Local spread is by spores (conidia) in rain-splash, on tools, or by insects.

12. Pepper mosaic is caused by a number of viruses. Plants may be stunted with small, crinkled leaves mottled light and dark green or yellow, develop ring patterns, or bands along the veins. Fruit that form may remain small, are roughened, otherwise distorted, or develop chlorotic blotches. The virus(es) are usually transmitted by aphids; certain ones by handling or brushing against plants (tobacco mosaic virus by touching plants after smoking or chewing tobacco).

13. Aster yellows of carrot, caused by a mycoplasma that infects 200 kinds of plants, causes center leaves to be dwarfed, blanch or turn yellow and often arranged in a tight rosette. Taproots are smaller than normal, very hairy, pale in color, with an unpleasant taste. The mycoplasma is transmitted by the six-spotted leafhopper, overwinters in numerous perennials and greenhouse plants, and moves northward with flights of infective leafhoppers.

14. Beet cyst nematode is caused by *Heterodera schachtii* which also attacks sugar beets and various crucifers. When populations are high, plants lack vigor, tend to wilt at midday, are stunted with poor root development. Plants may die early. Female nematodes appear as pearly-white specks (cysts) attached to the roots. Overwintering occurs as cysts in infested soil. Eggs remain alive for years in cysts which are spread by wind and any agency that moves contaminated soil.

15. Tomato root knot (and stem canker), caused by species of the nematode *Meloidogyne*, is often followed by secondary fungi producing stem decay and wilting. Root-knot nematodes infect 200 species of plants. When populations are high, plants are stunted, often wilt in hot-dry weather, yellow, and die early. Small to large, round, or long and irregular galls (knots) form in roots. Nematode wounds are invaded by bacteria and fungi and may result in wilting, root rot, and stem canker. Overwintering occurs in soil, is introduced on transplants, and spreads by movement of infested soil or running water.

16. Tomato blossom-end rot, is a non-infectious problem usually occurring where soil moisture levels fluctuate, and is most severe on staked and pruned plants. The blossom end of the fruit is water-soaked then enlarges and shrinks forming a dark brown to black, flattened to sunken area that may involve half of the fruit. Secondary organisms commonly produce a soft watery rot. It is common where rainfall is excessive early in the season followed by a drought.

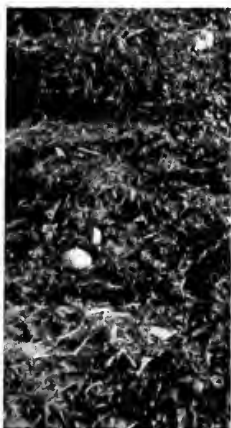
17. Physiological leaf roll of tomato, caused by the same conditions as blossom-end rot, is common on staked plants starting with the lower leaves. Leaves roll upward and inward, become stiff, leathery, and rattle when shaken. Growth is not noticeably checked. Plants bear a normal crop of fruit. It is widespread after deep and close cultivation or severe pruning and in poorly drained soils.

18. Potato leaf roll is caused by a virus. Leaves become thick, leathery and rolled upward, sometimes with a reddening or purpling on the underside. Plants lack vigor, are stunted, produce fewer tubers. A net necrosis (brown strands of dead tissue) develops near the stem end in tubers of some varieties. Virus transmission is by various aphids and planting infected seed pieces.

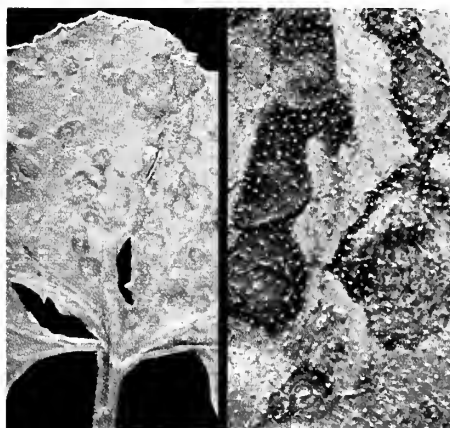
19. Pepper sunscald is evident on fruits exposed to direct sunlight; often follows defoliation from disease or on virus-infected plants. Whitish areas appear which become slightly sunken with a papery-white surface and may darken by secondary fungi and internal decay.

For cultural and chemical control suggestions, a listing of resistant varieties and other control measures, consult the Extension Plant Pathologist at your land-grant university or your county Extension office.

VEGETABLE DISEASES III



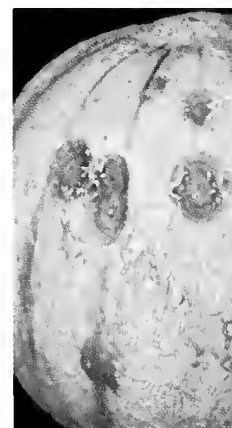
1. Alternaria leaf blight of watermelon



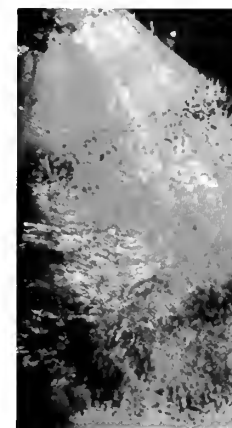
2. Alternaria leaf blight of muskmelon



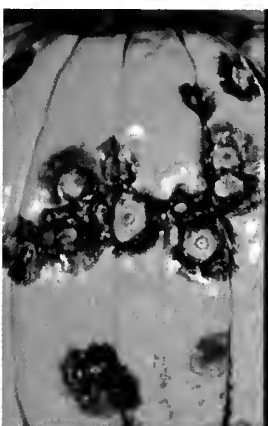
3. Alternaria fruit rot of cucumber



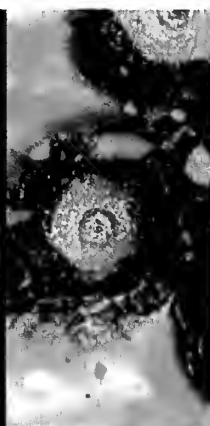
4. Anthracnose of muskmelon



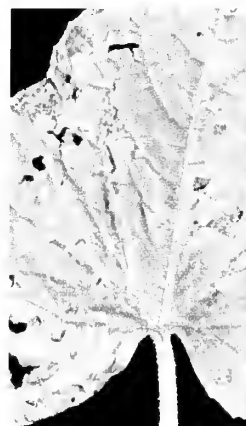
5. Rhizopus soft-rot of squash



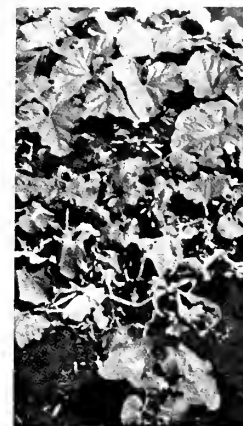
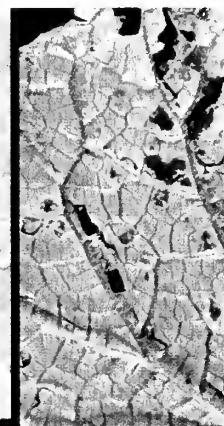
6. Black rot of pumpkin



7. Bacterial spot of pumpkin



8. Angular leaf spot of cucumber



9. Bacterial wilt of muskmelon



10. Gummy stem blight of watermelon



11. Mycosphaerella leaf spot of cucumber



12. Cucumber mosaic



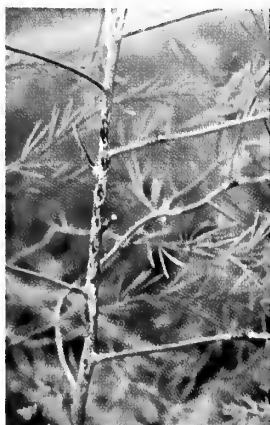
13. Squash mosaic



14. Ozone injury to muskmelon



15. Onion tipburn



16. Asparagus rust



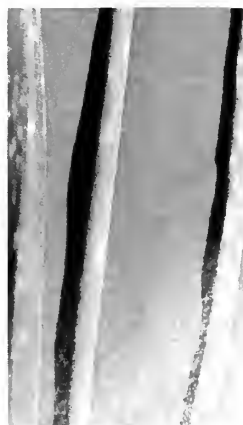
17. Onion smudge



18. Onion neck rot



19. Onion purple blotch



20. Onion Botrytis blight

VEGETABLE DISEASES III

1. **Alternaria leaf blight of watermelon**, caused by the fungus *Alternaria cucumerina*, appears in midseason on the oldest leaves and spreads to younger leaves. Enlarging, circular brown spots with concentric rings form on the upper leaf surface and are later covered by black moldy growth. Defoliation may result in sunscalding of fruit. The fungus overwinters in crop refuse, cucurbit weeds, and is seed-borne.
2. **Alternaria leaf blight of muskmelon** is caused by the fungus that infects watermelon and other cucurbits. Foliage symptoms are the same as for watermelon. Lesions may merge to cover a fourth of the leaf surface. Vines are defoliated lowering the yield and causing melons to ripen prematurely. Sunken, zoned brown spots develop on fruit and are later covered with a dark olive-green mass of spores (conidia). Spread is by wind-borne conidia or carried on clothing, tools, and in splashing or running water.
3. **Alternaria fruit rot of cucumber**, caused by *Alternaria cucumerina*, produces lesions as described under watermelon and muskmelon. Leaf spots are small, circular, and somewhat water-soaked before they enlarge, turn tan to brown and become zonate. Sunken spots in fruit are covered with a dark olive-green to black mass of spores. Generally older cucurbit plants are attacked, weakened by malnutrition or heavy load of fruit.
4. **Anthracnose of muskmelon**, caused by the fungus *Colletotrichum lagenarium*, attacks most cucurbits in warm wet weather. Small, yellow or water-soaked leaf spots enlarge and turn brown (muskmelon and cucumber) or black (watermelon). Leaves shrivel and die. Elongated, brown sunken lesions form on stems and petioles causing vines to die. Infected fruit develop circular, brown to black sunken areas, up to 2 inches across. When moist, the centers are covered with gelatinous masses of salmon-colored spores (conidia). Soft rotting-organisms often follow anthracnose. Overwintering occurs in plant refuse and on and in seed.
5. **Rhizopus soft-rot of squash**, caused by the fungus *Rhizopus stolonifer* (*R. nigricans*), is widespread following wet weather. Blossoms wilt and fruits rapidly become soft and water-soaked. A thick bushy mass of white then black mycelium is often evident, covered with black sporangia that resemble small, black-headed pins. Secondary organisms may produce a foul-smelling decay.
6. **Black rot of pumpkin** and most cucurbits is caused by the fungus *Mycosphaerella citrullina* (*M. melonis*); conidial stage *Phyllosticta citrullina*. Disease development is favored by warm, wet weather. Fruit rot starts as roughly circular, gray to brown spots that later turn black, often with a droplet of gummy exudate in the center. The fruit may become a rotted watery mass enclosed by the rind. On other cucurbits the fungus may cause seedling damping-off and pale brown or gray spots on leaves, petioles and stems (gummy stem blight). Large numbers of minute, black, fungus fruiting bodies (pycnidia and perithecia) form in diseased tissues, sometimes arranged in rings on the fruit or leaf surface.
7. **Bacterial spot of pumpkin**, caused by *Pseudomonas syringae* pv. *lachrymans*, infects many cucurbits. Fruit spots are first small, nearly circular, dark and scablike with a water-soaked margin; later become white and may crack open. The injured "skin" permits invasion of soft-rot organisms that cause decay of the fruit. The bacterium overwinters in diseased plant refuse and the seed coat. Spread is by rain splash and on hands, clothing, and equipment.
8. **Angular leaf spot of cucumber** is caused by *Pseudomonas syringae* pv. *lachrymans*. Angular to irregular, water-soaked spots form in the leaves. When moist, droplets of bacterial ooze form on the underside of lesions and dry down to a white residue. The lesions later turn gray to brown, dry, and tear away leaving large irregular holes. Overwintering and spread is as for bacterial spot of pumpkin.
9. **Bacterial wilt of muskmelon**, caused by *Erwinia tracheiphila*, infects most cucurbits. Watermelon is almost immune. Plants rapidly wilt and die starting with one or a few leaves on a vine. Squash vines are often dwarfed. The organism overwinters in the striped and 12-spotted cucumber beetles and is transmitted to healthy plants in the feces of the beetles. Invasion is primarily through insect feeding wounds.
10. **Gummy stem blight of watermelon**, caused by the same fungus that produces black rot of cucurbits, starts as oily-green areas on stems that elongate into streaks and exude amber-colored gummy material.

The plant may wilt and wither when the stem is girdled. The fungus overwinters in diseased plant refuse and is seed-borne.

11. **Mycosphaerella leaf spot of cucumber** is caused by the same fungus that produces black rot and gummy stem blight of cucurbits. Gray to brown dead spots form on leaves and petioles. Large numbers of speck-sized black pycnidia form in the lesions. Leaves may yellow, wither, and die. Overwintering and spread is as for gummy stem blight.
12. **Cucumber mosaic**, usually caused by the cucumber mosaic virus, has a wide host range being most destructive and widespread on cucumber and muskmelon. Fruit set is reduced. The fruit that do form are mottled with pale-green or whitish areas interspersed with dark-green areas that may be raised and knoblike; or the surface may be smooth, much of the green disappears, producing a "white pickle." Fruit have a bitter taste; when pickled are soft and soggy. Overwintering is in living plants; transmission is by aphids and, in some cases, through seed.
13. **Squash mosaic** is caused by several viruses. Leaves on older plants are mottled (pale green to yellow and dark green), distorted, wrinkled, and stunted. Young tip leaves form a rosette; older leaves may yellow and die. Plants are often yellow and dwarfed. Summer squash fruit may be knobby. Overwintering is as for cucumber mosaic. Transmission is by aphids and cucumber beetles.
14. **Ozone injury to muskmelon** appears as a stippling, mottling, and chlorosis of the upper surfaces of expanding leaves which, when severe, enlarge and become a bleached grayish-white. The veins commonly remain green. Sources of ozone include exhaust gases from internal combustion engines (nitrogen dioxide combines with oxygen and sunlight to produce ozone), the stratosphere and lightning strikes.
15. **Onion tipburn**, commonly caused by ozone injury, appears first as a yellowing and dying back of older leaves. Ozone is the most widespread and damaging air pollutant and a major component of smog. Tipburn-affected onion leaves are commonly attacked by *Botrytis*.
16. **Asparagus rust**, caused by the fungus *Puccinia asparagi*, occurs generally on susceptible varieties. Smaller twigs and needles turn brown or red from rust-colored dusty pustules (uredia) that are later replaced by black pustules (telia). Overwintering occurs on old stems in the telial stage. Dissemination is by wind-borne spores.
17. **Onion smudge**, caused by the fungus *Colletotrichum circinans*, appears on the bulb and neck as dark-green to black "smudges," often arranged in concentric circles. The black portion (as seen with a hand lens) has numerous stiff bristles. It is most pronounced on white onions and is confined to the neck of colored bulbs. The fungus overseasons on mature onion bulbs or in soil. Spread is by wind, rain splash, on tools and clothing, and on bulbs and sets.
18. **Onion neck rot**, caused by species of the fungus *Botrytis*, usually appears as sunken, dried-out areas around the neck. The scales appear soft and brownish ("cooked"). Small, white then black sclerotia, that may unite to form a crust, develop on the bulb, particularly around the neck. An ash-gray mold may appear on the bulb when damp. Soft-rot bacteria often follow neck rot, causing a soft, foul-smelling decay. Overwintering is primarily as sclerotia in plant debris and soil. Spread is mostly by windblown spores.
19. **Onion purple blotch**, caused by the fungus *Alternaria porri*, appears as brown spots on leaves and flower stalks that enlarge, become zonate, and somewhat purplish. The lesion margin is commonly a shade of red or purple and is surrounded by a yellow zone. When moist, the lesions are covered with a dark brown to almost black layer of spores (conidia). Leaves turn yellow and die beyond the girdling lesions. The fungus overwinters in plant refuse and spreads by wind- and water-borne conidia.
20. **Onion Botrytis leaf blight**, caused by species of *Botrytis*, commonly follows ozone or thrips injury, downy mildew, or other injuries. Enlarging white specks appear on the leaves which soon turn brown and collapse. Overwintering occurs in plant refuse; spread is mostly by air-borne spores (conidia).

For cultural and chemical control suggestions, a listing of resistant varieties and other control measures, consult the Extension Plant Pathologist at your land-grant university, or your county Extension office.

concentrations in the soil is physiological drought due to the osmotic potential of the soil solution effecting the ability of roots to absorb water and nutrients.

The best solution for winter desiccation and deicing salt damage is prevention. Water plants well before the soil freezes; rinse the foliage of plants that have been exposed to deicing salts; and construct a barrier between the source of the salts and the plants. Sensitive plants growing behind a fence are often unaffected. There is a reference to the use of anti-transpirants to prevent salt injury; however, research has shown that applications of anti-transpirants do not reduce or eliminate salt damage. (*David Williams*)

Rose Survival

This past winter was hard on many rose plants, even on those that were protected. Depending on the site, method of cover used, and type of rose, there will be winter-damaged canes. These are brown to black and dry when cut. If the bush is alive, new growth should be evident. In some areas, it may still be too early to see any growth; home gardeners should be patient before assuming the plants are dead and/or removing them.

On plants that are starting to grow, gardeners should check where the new growth is emerging. Hybrid teas, floribundas, grandifloras, and many climbers are grafted onto an understock. Buds arising below the graft union (the swollen area) are suckers and will produce undesirable growth. If these are the only buds present, the grafted part was winter-killed. Any buds arising above the graft indicate that the bush will be okay. Since roses in Illinois are planted with the graft union at or just below the soil surface, growers may have to probe carefully in the soil to determine from what part of the plant the shoots are growing. Miniature, shrub, and hedge roses are not grafted but grow on their own roots; therefore, there are no suckers.

A regular fertilizer program should begin after roses are uncovered. A rate of 3/4 to 1 cup of a balanced fertilizer per plant should be used to maintain plant vigor. (*Jim Schmidt, (217)244-5153*)

Illinois Turf Reeling from Past Weather Conditions

Waiting for the arrival of typical spring weather is testing the patience of many Illinois turf managers. Although winter's fingers are loosening, it seems that we are still locked in its grip.

Many turf managers have stated that considerable turf is in need of assistance this spring. Throughout Illinois these managers are reporting

- dead or damaged fall-seeded areas that were either planted too late or were unirrigated;
- poor turf rooting;
- dead *Poa annua* or perennial ryegrass, especially in areas where there was little or no snow cover;
- isolated patches of dead turf in shaded or thatchy areas; and
- very slow spring green-up.

Unfortunately, weather-related turf problems continued from last summer into the fall and winter. An unseasonably dry autumn, coupled with early frost and winter storms, affected fall seedings. Several periods of extremely cold weather, notably in areas without snow cover, when combined with stressed turf, resulted in winter-killed turf. At present, many areas in Illinois are still experiencing below-average soil temperatures and soil moisture. These conditions are slowing turf green up and growth.

Recommendations for Spring '96 Turf Care

To bring turf into shape this spring, several management activities can be used:

- If possible, delay applications of preemergence annual grass herbicides until the turf's condition is assessed. Preemergence annual grass herbicides, other than siduron (Tupersan), will inhibit germination in areas needing overseeding. Furthermore, the use of most other preemergence annual grass herbicides may negatively affect root production of shallowly rooted or weak turf.
- Raise mowing heights this spring to encourage root development.
- Delay cultivation activities until the turf is green and actively growing.
- Reduce traffic where possible.
- Many areas are abnormally dry; water turf as needed.
- Avoid application of large amounts of water-soluble nitrogen that may produce abundant shoots at the expense of roots; it may be better for turf health to spoon-feed nitrogen fertilizers this spring.
- To enhance germination in areas in need of turf cover, use vented covers or primed seed. Be sure to remove covers as temperatures rise.

Once the turf has recovered, try to maintain its health by providing good growing conditions (for example,

reduce shade, soil compaction, and thatch; avoid excessive nitrogen fertilization; mow as high as turf appearance and use will allow). (Tom Voigt, Tom Fermanian, and Bruce Branham)

INSECTS

Scouting

As we start the growing season, it's time once again to begin scouting for pests. This year is a good example of why active scouting is necessary to have a successful pest management program. With the cold weather this spring, most of the phenological plant and insect activities in central Illinois are about 2 weeks behind normal. Even basing treatments 2 weeks behind schedule in a calendar-based program is risky. If temperatures warm up dramatically, insect egg hatch and other activities can happen quickly and may catch pest management practitioners relying on a calendar by surprise. We will try our best to keep you updated on pest activities throughout the state through this newsletter; however, nothing will substitute for your developing and maintaining your own active monitoring program.

Scouting is the actual process of observing, recognizing, identifying, estimating, and recording pest problems in the landscape. The overall program of several episodes of scouting is referred to as monitoring. The ability to identify plant materials is necessary for scouting. A basic knowledge of pest identification and biology is also necessary for scouts to recognize damage, identify pests, determine if management is necessary, and time the management for periods when the pests are susceptible to control. Record keeping is the last important part of scouting. By keeping records, scouts can help identify "key plants," "key stresses," and "key pests." Recording trends in insect populations, and weed and disease problems throughout the year can assist in making management decisions. (John Lloyd)

Scouting Report

Eastern subterranean termites are swarming throughout the state. We've been receiving specimens since mid-February from nervous homeowners. When termites begin swarming in February, they emerge inside heated structures. As the temperatures warm up, the swarms occur outdoors. Unlike ants, termites have a broad waist and do not have elbowed antennae. If you suspect you have termites, we suggest that you read our fact sheet on termites, NHE-57, that can be

picked up at any University of Illinois Cooperative Extension Service unit office. Consult with a professional pest control operator if you do have a termite problem.

Eastern tent caterpillars are busy building their tents in branch crotches of trees in southern Illinois, according to Kay Long at the Marion Extension Center. Pruning out and/or physically removing the small tents in the evening when the caterpillars are inside the tent will reduce future defoliation. Treatments with *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide) will also control the young caterpillars.

Overwintering pine shoot beetles have been flying for awhile now, and Illinois Natural History Survey entomologist Charlie Helm has already caught some beetles for a new record in Piatt County, adding it to the 14 other infested counties in Illinois. Cultural control via trap logs is still the most effective control of the beetle for tree growers. However, the Illinois Department of Agriculture and federal agencies may have other requirements to ship material out of counties with beetle records.

When scouting, you may come across overwintering honeylocust mites at the base of stems. They will be noticeable as dark red dots. When they become active, they lay eggs around the buds. Most problems with the mites will occur when the next generation begins feeding on the leaves in the summer. Also, be on the lookout for spruce spider mites. The mites attack spruce, hemlock, arborvitae, juniper, and occasionally pine. They are a cool season mite, so look for them over the next few weeks.

It's not too early to begin looking for European pine sawfly in southern Illinois. They prefer red, mugo, Scotch, and jack pines but can also be found occasionally on eastern white and Austrian pine. They will feed in a group on older needles. Physical control via hand squashing is effective on small populations; however, carbaryl (Sevin) is also very effective.

For additional information on management options for these and other pests, the *1996 Illinois Urban Pest Management Handbook* provides current pest management recommendations for insects, diseases, and weeds in the landscape, home, and garden. The handbook can be purchased for \$12 from University of Illinois Information Services at (217)333-2007. (John Lloyd)

Imidicloprid

Imidicloprid, sold as Merit, has been on the market for several years as an insecticide for the control of white grubs in turfgrass. Compared to other grub

insecticides, it is relatively low in toxicity, high in cost, and long lasting. For white grub control, it is limited to one application per season. Research done throughout the country and particularly by Dr. David Shetlar, Ohio State University, has shown that applications in April or May will last into August and control Japanese beetle and annual white grub larvae. Golf course personnel have found that they can treat for black turfgrass *Ataenius* in May and not have to retreat for *Ataenius* and annual white grubs in July or August. Although this longevity is consistent, relying on it unnecessarily is not recommended.

A couple of new twists on this story have been added this year. An impregnated fertilizer formulation is available to commercial applicators. Some lawn care companies have been aggressively marketing spring application for grub control in the fall. Similarly, a 0.25 percent homeowner-available granule for white grub control is being marketed in the same manner. Scott's GrubEx is the common product currently, but others may also appear. The label states that one application can be made from April to August.

The application of an insecticide months before it is needed may make good profit sense, but it makes little sense ecologically. Any pesticide applied early allows breakdown to occur over the intervening time period that can reduce control at a later date. Although research shows this not to be an important factor with imidicloprid, widespread use with many soil types and other environmental conditions may expose any vulnerability that it may have.

In the several-month-long interval between spring application and late summer grub control, this insecticide will be killing other insects in the turf, some of which are beneficial and most of which are an important component of the turfgrass ecosystem. Years of research and experience have shown that the more simple an ecosystem, essentially one with fewer different kinds of plants and animals, the more likely it is to change drastically. In this case, these insects may be important in maintaining a stable ecosystem resulting in a healthy lawn. Their loss may result in turf decline in ways that we do not appreciate at this time.

Integrated Pest Management (IPM) suffers under preventative treatments such as spring imidicloprid application. An important part of insect IPM is identifying and treating only pest populations that are high enough to cause damage. Less pesticide is used and thus less money is spent and less impact is put on

the environment when low, nondamaging pest populations are not treated.

Waiting to apply imidicloprid until July, when a reasonable prediction can be made as to whether or not it is needed, is sound IPM practice. A heavy adult grub flight in early July coupled with dry weather will result in heavy egg-laying in irrigated areas. Imidicloprid should be applied at any time during July to those areas in order to prevent annual and Japanese white grub damage in August. In 1993, heavy late spring rainfall created moist soils and actively growing turf throughout Illinois. In that year, white grub populations were only high enough to warrant treatment in some small areas of northwestern Illinois. If imidicloprid had been available and spring-applied that year, needless pesticide application would have resulted over most of the state.

In summary, imidicloprid is an excellent white grub control product, as are several other insecticides on the market. Its springtime use should be limited in Illinois to golf courses and other areas where black turfgrass *Ataenius* is a problem. Application during July to other professional turf areas and home lawns should be considered where adult flight and turf growing conditions indicate that a damaging white grub infestation is likely. (*Phil Nixon*)

Scouting Tools for Insects

The single best scouting device is the traditional visual inspection. Many other tools are available that can make inspecting easier and more accurate. The basics in a scouting tool chest should include a hand lens, a strong knife, pruning shears, a spade, and several plastic bags. The magnifying tools will assist in determining if damage is insect- or mite-related, if insects or mites are present, and if the insects or mites have been killed by control measures. The other equipment is used to check under loose bark, to split stems, to remove pieces of branches, and to dig around roots and determine whether other stress or pest problems exist. Plastic bags are good for taking samples back to the office to look at under a microscope. Samples sent to a laboratory for identification should be placed in hard-sided containers, so that they won't be destroyed in the mail.

There are many types of sampling tools that can enhance scouting efforts by making it easier to detect insects or mites. Tools such as beating trays make it easier to identify insects that are small or difficult to detect. Beating trays—white material stretched over boards—are held under plant foliage while the foliage

is being shaken or struck to dislodge any insects or mites. Small insects and mites show up better against the white background. A simple substitute for a beating tray is a tablet of white paper.

Traps can also be used when sampling for insects. Some traps are simple. Double-sided tape can be wrapped around limbs infested with scales. When the crawlers (a stage of the scale that is susceptible to chemical control) emerge, some will get stuck on the sticky tape. By examining the tape, you can determine when the scales are in the stage that is most susceptible to control. Other traps, such as pitfall traps, will also passively catch insects that stumble across them such as black vine weevil adults. Disposable cups or cans should be placed in holes that are the depth of the cup. Adult black vine weevils will fall into the cups and be trapped because they are unable to fly or crawl out.

There are also many traps that are actually attractive to insects. The traps that are general attractants such as light traps or color traps are useful for monitoring insect activity to determine when an application should take place. These types of traps are of limited use for landscape maintenance because they attract relatively few pestiferous species in Illinois. Also an extensive background in insect ID is needed to sort through the hundreds of different species of insects that may be attracted to the traps. Color traps are efficient for monitoring in greenhouse situations in a closed environment where only a few species are attracted to the trap. They are also of use in monitoring some fruit pests in orchard situations.

There are species, or group, specific traps that are available for many insects attacking trees and shrubs. The majority of these specific traps use compounds called pheromones. Pheromones are derived from chemicals produced by the insects that act as sexual attractants or act to modify their behavior in other ways. Pheromone traps can be useful tools for monitoring flights of insects, and correlating them with egg laying and egg hatch. This information is often crucial for proper timing of insecticide applications. Pheromones are also useful in detecting newly introduced "exotic" insects. For example, pheromones are being used in Illinois to locate potential gypsy moth infestations so that control measures can be implemented to eliminate the moths before they spread. The physical traps, inside which the chemical pheromones are placed, vary in shape according to the insect's preference. Research is being conducted on the potential of using pheromones to confuse insects, disrupt their reproductive success, and repel them from plants.

Prediction models, based on temperature and plant phenology, are other scouting tools that help predict when activity of specific insect pests will occur and in turn when management actions should be applied to control the pests. Degree days—temperature accumulations related to insect developmental events—are one phenological tool that can be used by pest management specialists. *Horticulture Inside Lines* and other newsletters routinely use degree days to help practitioners predict when insect activities will occur. However, temperature accumulations happen daily, so even weekly degree day reports just provide a rough estimate of what is likely to happen.

Plant development, like insect development, is also relatively temperature dependent and can be influenced by other climatic factors. By correlating (connecting) insect events with plant events, we can develop other phenological models. Many of these models have been developed for different states with different plant materials. We are fortunate to have information that is Illinois-based. Don Orton developed a compilation of predictions based upon 20 years of field observations in the publication *Coincide*—which can be purchased from the Illinois Nurserymen's Association, 1717 S. Fifth St., Springfield, IL 62703.

All of these phenological prediction models are just tools to help you estimate when significant pest events will happen. Your own scouting program should fill in the gaps where prediction models cannot. Remember, YOU are the best scouting tool. (John Lloyd)

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G. Libran

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Eastern Tent Caterpillar

As reported in the last newsletter, Eastern tent caterpillars are busily pitching their tents in the branch crotches of various trees in southern Illinois. I saw several caterpillar tents near Edwardsville on May 1. The insect overwinters as an egg. The adult female moth deposits her eggs in a band around the twigs of host trees. Eggs hatch about the time that crabapple leaves are 1 inch long. Egg hatch also coincides with the bloom of *Magnolia X soulangiana*, saucer magnolia (which were harder to find this year because of the cold winter). These caterpillars feed on many host plants but prefer plants in the family Rosaceae (wild cherry, crabapple, plum).

A full grown Eastern tent caterpillar is hairy and black, with a white stripe down the middle of its back and a yellow line on each side. Below the yellow line is a row of blue spots. When full grown, it will move from the tree and pupate on the ground, trees, or even on the sides of buildings.

Eastern tent caterpillars leave the tent to feed on leaves and return to the tent at night or in rainy weather. The tent grows along with the caterpillars, and they are quite capable of defoliating a small tree. This insect should be managed while the larvae are still young. Physical removal of the tent and caterpillars while they are in the nest (evening or during rainy weather) is an effective nonchemical control. They are quite susceptible to control with *Bacillus thuringien-*

sis var kurstaki. Several other insecticides—including carbaryl (Sevin), chlorpyrifos (Dursban), and cyfluthrin (Tempo)—will provide excellent control. (Tom Royer)

European Pine Sawfly

European pine sawfly is rearing its ugly head (and tail) in various pine trees in southern and central Illinois. While the sawfly looks like the caterpillar, it is actually the immature stage of a wasp. The sawfly can be distinguished from the caterpillar by counting the number of prolegs on the abdomen: sawflies have 6 or more pairs of prolegs. It is important to be able to tell the difference because sawflies are not susceptible to control with *Bacillus thuringiensis*.

European pine sawfly has a black head with a grayish green body and lateral stripes. The flies are gregarious, meaning that they tend to feed in large groups. When disturbed, they rear head and tail in a U-shaped defensive posture. These insects overwinter as eggs that are deposited in pine needles. They feed on many species of pine, particularly red, Scotch, mugho, and jack pine. When the larvae mature, they move *en masse* off the tree host and drop to the ground, where they spin a cocoon and pupate in the soil.

When young, the larvae feed along the edges of individual needles, but as they grow, they devour the entire needle. Fortunately, they complete their feeding before the new growth fully emerges, which means that they will not kill the host tree. However, they can significantly reduce the aesthetic value of the tree because they feed on second-year needles and give the tree a mule-tailed appearance. It is best to control them while they are still young. They are susceptible to insecticidal soaps and summer oils. They can also be effectively managed with azadirachtin (Azatin, Bioneem, Margosan), carbaryl (Sevin), chlorpyrifos (Dursban) or diazinon. (Tom Royer)



Spruce Spider Mite

With *Magnolia x soulangiana*, saucer magnolia, in pink bud to early bloom in central Illinois, it may be time to check for spruce spider mite nymphs on spruce, arborvitae, juniper, hemlock, pine, Douglas-fir, Siberian larch, and other conifers in central and southern Illinois. Spruce spider mites are cool-season mites that attack stressed trees in the spring and fall of the year. They hatch from overwintering eggs into red-colored nymphs which begin feeding on the foliage. Mites feeding gives a mottled appearance to the needle, where they have inserted their proboscis and digested plant material.

Mite infestations can be identified by looking for damage on older needles and by shaking suspected infested branches over a white piece of paper. Little orange moving dots on the paper are probably spider mites. If different sizes and different colors of mites are found, you probably have predaceous mites that are feeding on the spider mites. Predaceous mites are also more active and move more rapidly than their spider mite prey. A hand lens can be used to distinguish between the different types of mites.

Three or more generations of spruce spider mite occur each year in Illinois. Most spider mite populations can be managed by reducing tree stress and letting natural enemies, such as predaceous mites, reduce their numbers naturally. In some cases pesticidal treatments may kill predaceous mites and other natural enemies that are feeding on the spider mites and, in turn, increase spider mite populations by releasing them from natural control. In severe infestations where natural control is not an option, repeated treatments with summer oils and insecticidal soaps can reduce spider mite populations. Check the label of the horticultural oil to make sure it will not be phytotoxic to the plant you are treating, and follow the application directions to reduce chances of damage. Oils will discolor blue spruce. Other chemical management options for spruce spider mites are listed in the *1996 Illinois Urban Pest Management Handbook*. (John Lloyd)

PLANT DISEASES

Spruce Problems

The Plant Clinic has recently received many questions about spruce problems and several samples of them. There are at least three common factors causing spruce problems; they involve weather stress, Cytospora canker, and Rhizosphaera needle cast.

In the previous issue of this newsletter, David Williams wrote that salt injury and winter desiccation have harmed many evergreens. Spruces have shown some defoliation and twig loss from drying winds over the past fall and winter. For at least the past 2 years, spruces also have been stressed by mid- to late summer drought conditions causing root damage. Root-damaged trees are predisposed to injury by other factors such as winter burn, salt, and disease pathogens.

Cytospora canker is a stress disease. The fungal pathogen is found at the base of branches causing death of the wood, excessive sap exudate near the trunk, and often death of the infected limbs. Cytospora affects lower limbs first and then moves up the tree. When a limb is infected, the entire branch dies. You will not see green tips on branches with this pathogen. The treatment is to remove dead wood, keep the tree well watered, and alleviate any sources of stress that can be determined. Fungicides are not recommended.

Rhizosphaera needle cast has been a persistent pest the past few years. This fungal disease thrives in years with wet spring weather. Despite the late summer droughts we have experienced, the springs have been wet. Rhizosphaera will cause needle drop, as do other stress factors on spruce, but it affects the newest needles last. Affected branches often have tufts of green needles at the tips, while other needles are brown or purple-brown. Newest needles may also be infected, but symptoms do not usually show until the year after infection. Expect to see Rhizosphaera on your spruce this year if you saw it last year. Although Rhizosphaera often moves from lower limbs upward, the disease may be scattered in the tree—producing a number of “holes” throughout the plant. The general feeling is that a single year of infection may not be fatal to a branch but that repeated infection and premature needle loss can kill branches. To confirm Rhizosphaera, look for neat rows of black, pinhead-sized fruiting bodies protruding from needle stomata. These can be seen readily in moist conditions on discolored needles. A hand lens may be helpful.

In order to help your spruce trees, try to determine whether or not Rhizosphaera is present. If so, initiate a spray program as outlined in the *1996 Illinois Urban Pest Management Handbook*. For all spruces showing stress, remove dead wood (prune in dry weather), try to alleviate stress, and keep the trees well-watered in periods of drought. Do not let the trees go into winter with root desiccation. (Nancy Pataky)

Botrytis Blight

Botrytis is a fungus that attacks tender, weakened, injured, and aging or dead tissues. It may cause blossom blight, bud rot, stem and crown rot, leaf blight, and damping-off or seedling blight. It is readily identified by the conspicuous tan-to-gray fuzzy mold that develops on rotted tissue in humid conditions. Because of this mold, Botrytis is often called gray mold disease. Greenhouse growers see this disease in overcast, cool, very humid and/or wet weather, as we have experienced lately.

Botrytis on tulips causes a disease called tulip fire. You may have seen this last week when weather was cool and wet. It will be a problem in beds where tulips are planted for several years or where tulips are crowded, injured by frost, or heavily mulched. Recent cases of tulip fire have been confused with insect injury or cold damage. The disease appearance begins with numerous stunted plants that emerge with leaves twisted, tightly rolled, and blighted. These shoots often collapse and die. When weather is damp, the tell-tale mold appears.

Once a tulip bed is infested, Botrytis blight becomes more serious in succeeding years. It is important to remove blighted leaves and flowers as soon as possible to reduce the pathogen build-up for following years. If feasible, do not plant tulips in the same location more often than every 3 years, and pick a location that is sunny with good air circulation and soil drainage. Detailed cultural practices are listed in *Report on Plant Diseases* bulletin No. 609. Fungicides are not of much value to tulips once they are infected with Botrytis, but they may be used as preventive sprays as leaves first emerge from the soil, especially in areas known to have Botrytis problems. Botrytis can often be stopped on other garden plants with the use of fungicides as listed under the specific host in the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Arborvitae Blackening?

Arborvitae have had some of the same problems with winter injury, salt burn, and desiccation that we have discussed with other plants. They also have a problem that has been observed for at least 5 years now and seems unique to this genus. The problem is a greasy blackening of the foliage, usually on inner leaves and usually in more densely foliated areas. Nancy Taylor

at the Ohio State University Plant Clinic reports that she sees it more often on the lower branches. We do not know the cause of this condition, and neither do other diagnosticians that we have spoken with across the Midwest. It is speculated that this blackening is related to the winter injury and water problems experienced. Nothing infectious has been recovered from this tissue. Prune it out and open the plant to improve air circulation. That is all that we can recommend at this time. (Nancy Pataky)

Reports on Plant Diseases (RPDs)

The disease articles in this newsletter will often refer to a detailed fact sheet on specific problems discussed. This is another source of information available to you. There are over 120 RPDs on disease problems of horticultural crops—including trees, shrubs, flowers, house plants, fruits, vegetables, and turfgrasses. These are available at \$1 per copy, with no discount for large orders. For a current listing, write to Extension Plant Pathology, Department of Crop Sciences, N-533 Turner Hall, 1102 S. Goodwin Ave., Urbana, IL 61801, or call (217)333-8375.

The RPDs do not contain chemical recommendations because of the constant need for updating such information. Chemical controls are updated each year and published in the Illinois *Urban Pest Management Handbook*, which contains recommendations for all urban plants. (Nancy Pataky)

HORTICULTURE

Roundup Pro

Roundup is available in a new formulation this year. Monsanto is replacing Roundup with Roundup Pro for industrial, turf, and ornamental use. Roundup Pro is simply the old Roundup plus an added surfactant. This addition improves several characteristics, including superior rainfastness, downgraded signal word, and faster burndown.

A comparison of Roundup, Roundup Pro, and Finale is shown below. As a reminder, Finale works with contact activity, while Roundup is systemic. There are advantages and disadvantages to each of these products. However, the new characteristics of Roundup Pro mean that it must be used with even more respect around desirable plants!

	Roundup (glyphosate)	Roundup PRO (glyphosate)	Finale (glufosinate- ammonium)
Mode of Action	systemic	systemic	contact
Injury occurs in . . .	7–14 days	4–7 days	2–4 days
Rainfast time	6–8 hours	1–2 hours	4 hours
Signal word	WARNING—eye irritant (moderate to severe)	CAUTION—eye irritant (slight to moderate)	WARNING—eye irritant (moderate to severe)
Skin irritation potential	nonirritant	nonirritant	mild irritant
Tank specifications	corrosive to steel	corrosive to steel	any type
Soil residual activity	none	none	none
Soil adsorption	strong	strong	moderate
How it breaks down	microbial activity	microbial activity	microbial activity
Soil half-life	<60 days	<60 days	7–20 days
Groundwater label advisory	no	no	yes
Formulation	solution, soluble dry pak	solution	solution

(Rhonda J. Ferree)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

NEWSLETTER

No. 4 • May 15, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information of insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Postemergence Chemical Controls of Broadleaf Weeds in Turf

It is time to initiate postemergence herbicide controls in areas where cool-season annual and perennial broadleaf weeds are actively growing.

In research conducted over a 5-year period at the University of Illinois Landscape Horticulture Research Center, several herbicides provided effective postemergence control of common broadleaf weeds such as white clover, dandelions, and plantains. These herbicides are 2, 4-D + MCPP + dicamba; triclopyr + clopyralid; and 2, 4-D + triclopyr. For additional information regarding other chemical weed controls or other weeds, see Chapter One of the *1996 Urban Pest Control Handbook*.

When using any chemical pest control, be sure to first read and then carefully follow the label directions for proper use of these chemicals. If mishandled or misapplied, postemergence broadleaf herbicides may damage or kill many desirable ornamental or edible plants in the landscape. Follow the general recommendations below when using postemergence broadleaf products:

1. Apply postemergence broadleaf herbicides when weeds are young and actively growing.

- a. Avoid applications when weeds are heat- or drought-stressed. These applications might interfere with herbicide uptake or translocation.
- b. Do not mow for a few days before application or following application to allow maximum leaf surface for interception and absorption of herbicides.
- c. Apply these herbicides to newly seeded turfgrasses only after they have been mowed 3 or 4 times. Wait at least 30 days following application before seeding into areas treated with postemergence broadleaf herbicides. Bromoxynil can be applied to newly seeded, nonresidential turf to control some broadleaf weeds.

2. Apply postemergence broadleaf herbicides when environmental conditions are appropriate for control.
 - a. Watch wind speeds to avoid drift. Early morning is often the best time.
 - b. Do not apply these herbicides when air temperatures are expected to exceed 85°F.
 - c. Adequate soil moisture is important to maintain growth and translocation of the herbicide throughout the entire weed.
 - d. Do not apply when precipitation is expected within 24 hours. Don't irrigate turf for several days following application.
 - e. Be especially cautious of ester formulations as air temperatures rise. Ester-formulated broadleaf herbicides are more prone to volatilization than amine-formulated herbicides.



3. Rather than treat large areas, make spot applications, when possible, to reduce unnecessary pesticide use.
4. Many cool-season annual and perennial broad leaf weeds are best controlled in autumn. Apply postemergence herbicides during fall when broadleaf weeds are actively growing. Use spring herbicide applications to control broad-leaf weeds that escape autumn control.

(Tom Voigt and Bruce Branham)

Garlic Mustard

For a few years now, we have been hearing about garlic mustard, *Alliaria petiolata*, and how it is aggressively choking out native woodland wildflowers. Susan Post of the Natural History Survey wrote a wonderful article about garlic mustard in the *Illinois Forest Management* newsletter, 1995, Vol. 2, No. 29. In the article Ms. Post indicated that "large expanses of blue-eyed Mary's at Allerton Park were slowly diminishing."

Garlic mustard is an extremely aggressive species that has invaded Illinois's northern and central woodland communities. In Illinois the plant behaves mostly as a biennial. After germinating in the spring, the plant spends its first summer and winter as a rosette of heart-shaped leaves (2 to 8 inches long) with course, round, irregular teeth on the margins. During the following spring, the plants send up a 1- to 2-foot flowering stalk of small, four-petaled, white flower clusters.

The plant spreads exclusively by seed. Some plants produce as many as 8,000 seeds! Therefore, the goal of any garlic mustard control program is to prevent seed production until the seed bank is exhausted, usually a 2- to 5-year period. Along with cutting the plants, controlled burns and herbicides are used. Roundup works best in the spring and fall when the plants are actively growing. (Rhonda J. Ferree; Adapted from "A Touch of Garlic," *Illinois Forest Management*, 1995, Vol. 2, No. 29.)

PLANT DISEASES

Apple Scab Update

Fruit pathologist Steve Ries reports that the scab fungus has been sporulating on unsprayed susceptible apple trees at the Urbana campus since about May 6. This means that primary infections have formed spores that serve as secondary inoculum for further

spread of the scab fungus. The severity of this disease increases with the duration of wetting, so we can expect a very severe scab season. Do not be fooled by the lack of visible symptoms at this point because symptoms appear 8 to 18 days after infection under warm, wet conditions.

Dr. Ries also states that if you are considering spraying a fungicide at this late date, consider back-to-back sprays with a sterol inhibitor such as Rubigan. Such chemicals suppress sporulation. They are, however, almost exclusively available to the commercial audience and can be quite expensive. Home-owners with susceptible crabapples should consider replacement of susceptible species this year. It is predicted that 1996 will have even more Scab than 1995. That being the case, older, susceptible crabapples will look very poorly soon. Consider replacement plantings with one of the many scab-resistant lines now available. When visiting the nursery, also look for resistance to Rust and Mildew in the same plant. If you move quickly, you will still have time for new plantings this year. (Nancy Pataky)

Strawberries in Poor Shape

The harsh winter has caused a significant loss to strawberry production this year. Dr. Ries said that in some cases a decrease of 50 to 100 percent of the crop has occurred. Now, with warm wet conditions, growers can expect further losses from infection of the fruit by Botrytis (see issue No. 3) and/or leather rot (Phytophthora). Mulch under the plants to help plants dry more rapidly and to keep fruit from coming in contact with the soil. Fungicide applications are outlined on page 225 of the *1996 Illinois Urban Pest Management Handbook*. Recommendations to control Botrytis (gray mold) begin with a multipurpose fruit spray plus Captan or Benlate at the appearance of the first blossoms. (Nancy Pataky)

Volutella Blight of Pachysandra

This leaf and stem blight can cause necrotic blotches on leaves, or it may kill large patches of plants. Brown to black blotches form in the leaves or on the stems. When lesions occur on the stem, the plant dies beyond that point. In wet weather the pink- to orange-spore pustules can be seen on the underside of infected leaves and stems. The disease will be seen in dense plantings where heavy mulch has been used and conditions are warm and moist. Pachysandra beds that have been stressed by winter, drought, insects, or overcrowding are more susceptible to this fungal disease.

Removing any known sources of stress is the most logical step to disease management. However, even in well-kept beds, this disease may appear with continued warm, wet weather. Consult *Report on Plant Diseases* bulletin No. 649 for cultural disease control suggestions, and consider a protective fungicide such as chlorothalonil (Daconil), mancozeb, or Zyban. Sprays begin in the spring when new growth begins and are repeated at 10- to 14-day intervals as warm, wet weather continues. Be certain to follow label directions carefully. (Nancy Pataky)

Anthracnose of Shade Trees

Anthracnose is a general term which is used to refer to a disease caused by a fungus with a specific fungal fruiting structure (acervulus). We refer to anthracnose here as a disease of shade trees caused by one of several fungi which may invade leaves, twigs, shoots, or buds. Sycamore anthracnose is most common to many tree specialists. We also commonly see the disease on maple, ash, and oak in Illinois.

Leaf infections (that will appear very soon) result in large necrotic areas or blotches on the leaves. Later leaf infections appear as more discrete spots, often surrounded by a ring or border. Linden, elm, maple, and ash may have this group of symptoms. Ash trees also often show extensive defoliation from anthracnose. The disease is not usually fatal, however, since infected trees often re-foliate in June with warmer, drier weather.

Sycamore and oak exhibit four phases of anthracnose: twig blight, bud blight, shoot blight, and leaf blight. The twig blight phase may kill 1- or 2-year-old twigs if they become girdled. Larger twigs and branches may be cankered and serve as overwintering sites for the fungus. There are often so many of these cankers that removing them by pruning is not practical. The bud-and-shoot-blight phases of infection kill these plant parts quickly as they expand. With sycamore the disease is most severe when the average temperature for the 2 weeks following bud break is 60°F or less and moisture is present. The bud-and-shoot-blight phase of sycamore anthracnose may go unnoticed because the species is naturally late to develop in the spring. Take a close look at sycamore stems. If the tips are dead and buds below the tip are leafing out, anthracnose has already been at work on that tree. As with scab on crabapples, expect anthracnose to have a banner year in 1996.

Anthracnose fungi of shade trees are known for leaf spotting, defoliation, and branch dieback but

rarely for the death of a tree. It is generally accepted that if anthracnose is severe for several years, then the tree may be weakened and begin to decline. Trees already stressed by soil, site, and environmental factors are less tolerant of anthracnose infection and may begin to decline after only a year of severe anthracnose infection. It remains to be seen how well trees recover from last year's severe anthracnose, but prospects will not be as good if this year also offers a severe anthracnose season.

There are fungicides labeled for use against these fungi. These are listed under the specific tree host in the *1996 Illinois Urban Pest Management Handbook*. The fungicides are meant to be used as preventives before the fungus infects, so usefulness of applications at this time is questionable. In fact, fungicide treatments against anthracnose on shade trees has not been our recommendation because of product cost, labor, and the fact that in most cases the disease is not fatal. Try to improve tree vitality through pruning, watering and fertility practices. This will help the tree put out a second flush of leaves. (Nancy Pataky)

INSECTS

Scouting Report

There is nothing like a week of rain and lightening to make scouting an adventure. Eastern tent caterpillars are out, but their numbers appear to be lower this spring than in past years. Just a hunch, but the damp conditions that are a boon for plant pathogens are also good for insect pathogens. Sickly or dead caterpillars may be indicative of an insect disease. In this circumstance, the diseases are our friends. If you see dead caterpillars, leave them on the plant material, or move them to other caterpillar-infested materials. Let's spread the inoculum.

Apple grain aphids are feeding on newly emerging leaves of hawthorn, causing some leaf distortion including leaf curl. This aphid normally emerges in early spring from overwintering eggs. The buildup of apple grain aphid populations is favored by cold, wet weather which inhibits their natural enemies.

Adult aphids are yellowish green with a dark green line with 4 to 5 crosshatch lines running down the middle of the back. The antennae, legs, and cornicles (tail pipes) are yellow with black tips. Adults may be winged or wingless, but the majority of them are winged and, upon maturity, migrate to their summer hosts, which include many grasses and commercially

grown small grains. In the fall, male and female aphids return to the apple host where they mate. Females lay eggs on the bark and twigs near wintering buds.

Because the aphids seldom remain on their apple/hawthorn hosts for very long in the spring, they will not likely need to be controlled, but insecticidal soap is effective for heavy infestations.

There is not an insect that creates perfect rows of holes on trees. It is actually the yellow-bellied sapsucker that flies north through Illinois each spring and flies back south through Illinois in the fall. We have received several calls about sapsucker damage on trees in northern Illinois. Sapsuckers drill lines of holes in trees and feed on the sap and the insects that are attracted to the sap. Trees in Illinois will generally survive damage by sapsuckers, since they only feed as they are moving through the area over a period of weeks. The sapsuckers have favorite trees that they will feed on year after year. Placing burlap around the attacked area on the tree when the birds migrate through may reduce the problem. (*John Lloyd and Tom Royer*)

Pine Shoot Beetle Survey

Thus far in 1996, the common pine shoot beetle is certainly living up to its name; it appears to be increasingly common in occurrence in Illinois. The Illinois Natural History Survey is cooperating with federal Plant Protection and Quarantine personnel in a 21-county trapping program adjacent to known areas of infestation to more fully determine the extent of pine-shoot-beetle distribution. With the recent addition of Piatt, Lee, and Boone counties as positive locations, we now have a total of 18 infested and quarantined counties, encompassing the northeast quarter of the state.

Do these new finds mean that the pine shoot beetle is rapidly spreading across the state? Although these

beetles are able to fly considerable distances and are one of the earliest bark beetle species to emerge, it probably does not. More likely, we are seeing merely the results of our intensive trapping program. As new locations are detected, we—not necessarily the beetles—move. Once a county is determined to be infested, our trapping program moves into adjacent counties where beetle surveys were not previously conducted. As a result, there will likely be more reports of “new” infestations in the future. Current federal and state regulations require that all pine-shoot-beetle-infested counties be quarantined to attempt to prevent the movement of potentially infested materials into uninfested sites. For details on specific aspects of quarantine regulations, contact the Illinois Department of Agriculture. (*Charlie Helm, Illinois State Survey Coordinator, 333-1005*)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

MAY 30 1996

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No. 5 • May 22, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Phomopsis and Kabatina Blight of Juniper

Phomopsis blight is the common tip blight pathogen on junipers in Illinois. The newest growth is susceptible to infection and becomes resistant once needles become a normal dark green. Infection occurs on the youngest needles starting as yellow spots. Shoot tips then turn light green and then brown. Usually, however, the first symptom seen by the homeowner is the reddish brown color of shoot tips. A grayish band is often visible at the base of the dead shoot, and in this band are pinhead-sized black fruiting bodies of the fungus. These *pycnidia* are visible with the naked eye or with the aid of a hand lens. Occasionally, a stem canker is also found in association with this disease.

The *Phomopsis* fungus is persistent. Spores germinate under moderate temperatures (60° to 82°F) and high humidity within 7 hours after coming into contact with new foliage. Even if the foliage dries before infection occurs, the spores do not die. They begin growth again with wet weather. Pycnidia form by 3 to 4 weeks after infection. Spores are dispersed by splashing rain. Weather conditions in the last 2 weeks have been ideal for this fungus.

If tip blight symptoms occur in the early spring—before shoot growth has begun—then a close relative to Phomopsis tip blight is most likely to blame. Kabatina blight is caused by a fungus that infects through wounds in hot weather. The fungus forms fruiting bodies from February through May of the following year. If you see symptoms that appear to be

Phomopsis blight but are occurring too early, Kabatina is likely. The fruiting structures are similar but can be easily differentiated in a lab.

Phomopsis may be controlled by pruning out infected foliage when the plant is dry and by using preventive fungicides. Pruning is important because the most common source of infection is infected tissue from the prior year. Prune only dry foliage to avoid spreading spores. Pruning is a form of wounding and may increase the chance of infection with Kabatina, but by pruning in dry weather the risk is lessened. Fungicide recommendations are provided on page 86 of the *1996 Illinois Urban Pest Management Handbook*. Homeowners have complained that chemicals are often only available to commercial applicators. Note that Halt is a product by Fertilome that is packaged specifically for homeowners. Consult *Report on Plant Diseases* bulletin No. 622 for details about Phomopsis tip blight and its control.

The chemical applications will not have much affect on Kabatina. Control for that disease has not been documented. Fortunately, it is not as aggressive a pathogen as Phomopsis. Since injury is important in spread of Kabatina, look for more of this disease after the extensive winter injury of 1995–1996. (Nancy Pataky)

English Ivy Leaf Spots

English ivy is a popular ground cover plant in the Midwest that is generally very hardy. It is commonly attacked by a bacterial leaf spot and occasionally by fungal leaf spots as well.

Bacterial leaf spot and stem canker is the more common disease. It appears as small, circular, dark green, water-soaked (oily) lesions on the leaves. As these enlarge, they have reddish brown to black centers with a water-soaked margin and (sometimes) a yellow halo. The spots also crack with age. In warm, wet weather, the bacterium causes black cankers on the stems and petioles; stems die, often with black tips.



The fungal leaf spots are caused by a variety of fungal species. They cause round to irregular spots in a variety of colors. Often, a series of concentric rings can be seen in the spots. Look closely on the spots for small black specks, which are the fruiting structures of the fungi. If you are going to use a chemical control, you *must* determine whether the bacterial or fungal pathogen is involved in order to choose the proper product.

If you establish a bed of ivy this year, look closely at new plants to be certain that you do not introduce diseased plants. Remove any questionable leaves or stems. It is also a good idea to remove old leaves and debris from dry beds each spring before new growth begins.

Because these diseases require water on the foliage to infect new blades, it is recommended that growers water the soil rather than the foliage and do so early in the day to promote quicker drying. This year the foliage has been naturally wet for many days, making infection likely.

If leaf spots have been severe in the past, determine whether the fungal or bacterial pathogens are to blame and consider a chemical application program as soon as possible. Registered chemicals are listed on page 125 of the *1996 Illinois Urban Pest Management Handbook*. Repeated applications are necessary at 7- to 10-day intervals as long as wet weather persists in spring and early summer. There may still be some benefit of applications for problem areas not yet sprayed. Few chemicals protect plants from the bacterial leaf spot and stem canker. Only the copper compounds help, and control is not complete. Try to improve air movement in the area by thinning the stand and pruning surrounding plants. Never work with the plants when they are wet. For more information about these diseases, consult *Report on Plant Diseases* bulletin No. 652. (Nancy Pataky)

Pine Wilt

Pine wilt is the name of a disease caused by the pinewood nematode. The vector of the disease is the Sawyer beetle. Many readers may be familiar with nematodes as the cause of root or soil-related problems. In this case the nematode invades the wood, causing blockage of water-conducting tissues and thus of wilt symptoms—as do the fungal vascular wilt diseases.

Pine wilt causes a sudden decline and death of the entire tree within a few weeks or months after the first sign of disease. Symptoms actually occur in four

stages. Needles initially appear light grayish green, then yellowish green, next yellowish brown, and finally completely brown. The affected trees will show this color change either branch by branch or over the entire tree. The exception may be Austrian pine. We have seen cases where that species was positive for pine wilt but initially showed symptoms on branch tips. This year we have seen many pines with root problems, water-related stress, or cold injury. Those trees generally decline from the top downward, or starting at the bottom and moving up the tree, or possibly from the tips inward. Needles do not progress from gray green to brown. Instead, necrosis is fairly quick.

Samples to be tested for pine wilt should be sent to the Plant Clinic, 1401 St. Mary's Rd., Urbana, IL 61801. The fee is \$15. Take branch sections 1 to 2 inches in diameter and 6 to 8 inches long. The wood should come from branches where needles are brown but still attached. The nematode could occur anywhere in Illinois. Several positive cases have already been processed at the Plant Clinic this spring, but most of the pines have been negative for the nematode. Those pines have been injured by other factors—as has been discussed in previous newsletters.

There are no known effective chemical controls for this disease or its vector. Affected trees should be burned or buried in order to reduce reservoirs of infection. Also, dead branches should be pruned from live trees to minimize attractiveness to beetle feeding. Beetles that emerge from the dead wood may carry the nematodes and fly to healthy pines as far as several miles away. When the beetle feeds on a healthy pine, it may transmit the nematode to the tree through feeding wounds. The nematode enters the resin canal and eventually clogs the water transport system of the tree.

Replace dead pines with Norway or blue spruce, Douglas-fir, cedar, or hemlock, which are not susceptible species. Consult *Report on Plant Diseases* bulletin No. 1104 for details about this disease and how to take samples for laboratory testing.

Each year the question arises whether infected pines may be chipped and used as mulch. If a tree is known to be infected, this is probably not a good idea. However, in most cases the question arises because of the availability of free mulch from municipalities. Is it infested with nematodes? Of course, we cannot know whether or not the nematode is present. The actual risk of using this mulch is probably low. Research shows that the nematode does not move from the

mulch through the soil and into the roots. Research also shows that Sawyer beetles do not frequent wood chips. The conclusion is that use of infested wood chips probably does not pose a problem as far as pine wilt is concerned. Still, if possible, try to use composted mulch or mulch that has been dried out before use. (Nancy Pataky)

HORTICULTURE

Spring Emergence Update

We are still in a wait-and-see mode for many plants this spring. Most plants in Illinois are 2 weeks behind normal spring growth. Although most should have emerged or broken bud by now, some may simply be especially slow this year. This week in central Illinois I saw buds break on spruce, amelanchier, and Japanese maple. Although some severely salt-damaged evergreens are dead, others are showing new candle growth. The sub-shrubs such as *Perovskia* (Russian sage), *Buddleia* (butterfly-bush), and *Lavendula* (lavender), although woody, typically die back and resprout from the roots in Illinois. These plants require several warm days to start growth. Be patient. Look for signs of life before pruning back material that is apparently dead. Some plants will survive this cold, wet spring. When they do, prune dead material back to the new growth—a bud or a branch. (Rhonda Ferree)

Waterlogged Plants

Most of Illinois has experienced excessive rains, which have resulted in waterlogged soils and flooding. It is important to understand what is happening to plants growing in these conditions and what to expect later. It is a wait-and-see situation. Many herbaceous plants are experiencing injury symptoms now. Visible injury symptoms on trees and shrubs may not occur for a year or more.

Injury Symptoms: Injury symptoms, which vary according to several factors, include decreased growth of shoots and roots, decreased transpiration rate, leaf chlorosis (yellowing), leaf epinasty (twisting), leaf abscission (drop), death of roots, increased susceptibility to attack by predators and pathogens, absence of fruiting, and death.

The main reason injury occurs is related to oxygen availability in the soil. In flooded or waterlogged soils, oxygen diffuses slowly and reduces in concentration to a few percent or zero. As oxygen is ex-

cluded from roots, there is decreased aerobic root respiration, root growth, transpiration, and translocation.

Factors Influencing Survival: Although survival is directly related to species tolerance of waterlogged soils, other factors are important, including the soil type; the time, duration, and depth of the water; the state of the floodwater; and the age and size of woody plants.

Tolerant species such as bald cypress, littleleaf linden, redbud, dogwood, mulberry, silver maple, and willow can live on sites in which the soil is saturated for indefinite periods during the growing season.

Moderately tolerant species such as green ash, hawthorns, honeylocust, pin oak, red maple, river birch, sweetgum, and sycamore can stand saturated soil for a few weeks to several months during the growing season but die if waterlogging persists or reoccurs for several consecutive years.

Weakly tolerant species such as American holly, balsam fir, black walnut, bur oak, catalpa, hackberry, douglas fir, Eastern cottonwood, and red oak can stand relatively short periods of soil saturation—a few days to a few weeks—during the growing season but die if waterlogging persists for longer periods.

Intolerant species such as American beech, black locust, crabapples, Eastern hemlock, flowering dogwood, paper birch, pines, redbud, spruces, sugar maple, tuliptree, white oak, and yews die if subjected to short periods of 1 or 2 weeks of soil saturation during the growing season.

What to do now: Unfortunately, little can be done to prevent damage to plants growing in waterlogged soils. If a woody plant shows injury symptoms, such as leaf drop, do not immediately replace it. Some plants will show initial injury symptoms and then recover. Many woody and herbaceous plants, including turf areas will not recover. Be patient. Whether your plants are simply waterlogged or actually growing in flood areas, it will take a while to see the full extent of plant damage. (Rhonda Ferree)

INSECTS

Scouting Report

Vanhoutte spirea, *Spiraea vanhouttei*, is in full to late bloom in southern Illinois, full bloom in central Illinois, and should be blooming by next week in northern Illinois. Several important insects are

susceptible to control measures when this phenological event occurs.

Black turfgrass ataenius first-generation egg-laying occurs when *Spiraea vanhouttei* is in full bloom. Treatments can be made to golf courses and other high maintenance turf at that time to control egg-laying adults and resulting grubs or in about 2 weeks to control hatching grubs. Many golf course superintendents prefer to use imidicloprid (Merit) to provide season-long control of all white grubs. Bendiocarb (Turcam) and isozofos (Triumph) are also effective although Triumph can only be used on greens, tees, and aprons. If one waits until the grubs hatch, trichlorfon (Dylox, Proxol) will be effective. The second generation is susceptible to control at the same time as annual white grub and Japanese beetle.

Bronze birch borer adults are emerging from white barked birch in southern Illinois and will be emerging in central Illinois in the near future. The best control for bronze birch borer is to plant less susceptible varieties such as river, heritage, or whitespire birch and keep the plants well watered in times of drought. The usual time for chemical treatment with chlorpyrifos (Dursban) is when *Spiraea x vanhouttei* finishes bloom. This insecticidal treatment for bronze birch borer is aimed at controlling the newly hatching larvae before they burrow through the bark into the tree. Treatments with chlorpyrifos (Dursban) should be applied at that time and repeated twice at 2-week intervals. A single treatment with dimethoate (Cygon) concentrate equal to the width of the trunk at the treatment spot—but no wider than 6 inches—may kill larvae inside the tree since dimethoate is a systemic insecticide and is translocated throughout the tree. *This treatment only works on birch*, because the trees are thin barked, and should be applied later when the larvae are in the tree. The concentrated compound is toxic and should be watched until it dries to prevent any accidental contact. *Due to high toxicity of the concentrate and its quick movement through human skin, the dimethoate treatment should be applied by professionals.* This will also provide control for birch leafminer.

Oystershell scale brown race that primarily attacks apple, dogwood, and poplar has crawlers out when *Spiraea vanhouttei* is in full to late bloom. The banded or gray race that primarily attacks lilac, ash, willow, poplar, and maple produces crawlers later, when *Spiraea vanhouttei* has just finished bloom. Scale crawlers can be controlled by most insecticides, including insecticidal soap and summer spray oil.

Other insecticide suggestions are in the *Urban Pest Management Handbook*.

Honeylocust plant bug nymphs are present in central and southern Illinois. Numbers appear to be slightly lower than the treatment threshold of roughly one bug per compound leaf. Dave Shetlar, Ohio State University, has noticed an association between treatments for plant bug and later infestations on honeylocust mite, so avoid treatment if numbers of bugs are low.

Potato leafhopper is present on red maples in southern and central Illinois and should be present within 2 weeks in northern Illinois. Bifenthrin (Talstar), carbaryl (Sevin), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), and permethrin (Pounce, Ambush, Astro) are effective in controlling this insect. Sevin should provide up to 1 week of control, whereas the others, the pyrethroids, should last for 2 to 3 weeks. Pounce and Ambush are labeled only for nurseries.

Elm leafminer eggs are being laid in northern Illinois. This insect attacks American, English, Scotch, and Camperdown elms. Control can be achieved with sprays of diazinon, chlorpyrifos (Dursban), or cyfluthrin (Tempo) at this time.

Deer ticks and other blood suckers are becoming a problem in northern Illinois. One person with a deer tick had the bull's eye rash that is diagnostic of Lyme disease. When in a tick-infested area, wear a long sleeved shirt and trousers and tuck your pant legs into your socks. The repellent DEET can be used, but you can also use permethrin (Permanone) insecticide on your clothing to kill ticks that do get on you. Check for ticks on your skin and clothing every few hours. If you find a tick imbedded in your skin, remove it by grasping the mouthparts with forceps (tweezers) and pulling it out of the skin. If you get flu-like symptoms after being bitten by a tick or a rash where a tick was imbedded, consult a physician. (Phil Nixon, John Lloyd, Noel Troxclair, Fredric Miller, and Tom Royer)

True White Grubs

True white grubs, the larval stage of May beetles (*Phyllophaga*) feed on a wide range of plant roots. We have been receiving reports of their feeding not only on turfgrass but also on tree and shrub roots.

There are many species of true white grubs with a variety of life cycles, ranging from 1 to 5 years in length. Throughout most of the state, the most common species have 3-year life cycles. The adult beetles emerge in the spring and feed on tree leaves at

night—this feeding was common last spring. They lay eggs in the soil that hatch in midsummer into larvae that feed on a wide variety of plant roots, particularly turfgrass roots. They descend deeper into the soil for the winter, coming up to feed throughout the next growing season. In the fall of the second year they descend again for the winter. After ascending to feed for a short time in the spring, they pupate and emerge as adults that spend the rest of the summer and the following winter underground. They emerge from the soil the following spring to complete the 3-year life cycle.

As mentioned above, adult feeding was common last spring and white grub larvae are common this spring. Although many of these larvae are mature white grubs, true white grub larvae are common. Although the numbers that are being found are not high enough to cause turf damage, they can be an attraction to skunks and raccoons, who will tear up the turf to get to the grubs. These true white grubs are numerous enough to be causing damage to young trees in Christmas tree farms, nurseries, and landscapes.

Control true white grubs on ornamentals with an application of diazinon. Chlorpyrifos (Dursban or Lorsban) can also be used; it will be less effective in soils with a high organic content but should do well in sandy soils. There are more labeled insecticides for turf treatment, and one should refer to the *Urban Pest Management Handbook*. Any grub treatment should be watered in with at least 1/2 inch of water to get the insecticide down to the grubs. This can be provided through irrigation or rainfall. Realize that diazinon and imidicloprid may take 3 weeks to kill the grubs but that grub feeding may be quite reduced during that time. (Phil Nixon)

Pine Root Collar Weevil

Pine root collar weevil, *Hylobius radialis*, has been tentatively identified in Christmas tree farms in west central Illinois near Beardstown. There is characteristic larval and adult damage to Scotch pine, and collected beetles are likely to be that species. The collection of newly emerged adult males late this summer should provide positive identification.

Adult weevils are long-lived; they feed on the twigs of several species of pines, causing damage similar to Pales weevil and northern pine weevil. Typically, damaged twigs are 1/8 to 1/4 inch in diameter. The adult beetle chews through the bark, removing bark halfway around the twig for a distance

of 1/2 inch or more down the twig. This damage causes flagging of that twig, turning the needles brown.

Eggs are laid by the adult weevils from late May to September with most eggs laid during June. The eggs are laid just below soil level in the soil or in the trunk of Scotch, Austrian, red, jack, pitch, Swiss mountain, and occasionally Eastern white pine. The eggs hatch into larvae that bore under the bark, girdling and weakening the tree. The larvae are white, about 3/8 inch long when fully grown, thick-bodied, and legless. They pupate and most emerge as adults in August.

Adult weevils are 3/8 to 1/2 inch long, elongate, hard-shelled beetles. They are black with light spots on the wing covers. The head is prolonged into a fairly stout "snout." These adults live in the fallen needles under the tree, and just under the soil surface. They emerge, particularly at night, to feed on the twigs of pines. Adults live for more than a year and probably lay eggs during 2 growing seasons.

Larval-attacked pines have dieback, being seen first as dead terminal and accessory shoots at the top of the tree. More advanced girdling results in the yellowing of needles at the top of the tree that soon covers the entire tree. Heavily attacked trees can be easily pushed over, the trunk snapping off just below the soil line.

Larval attack results in black soil next to the trunk due to sap leakage. There are usually masses of hardened, whitish, exuded pitch at the soil line. The trunk just below the soil line has 1/8- to 1/4-inch diameter tunnels just below the bark. In most cases, the overlying bark sluffs off during digging to reveal these tunnels. The trunk in this area is narrower due to this tunneling than it is above and below the damaged area. This larval-damaged area frequently extends for 3 to 4 inches below the soil line.

Control can be achieved by spraying lindane on the soil under the tree in mid-May (late May this year) and mid-August. Removing the dead needles from beneath the tree and removing the lower whorl of branches aid in control and can provide some control without insecticide application. Chlorpyrifos (Dursban) can also be used if desired. Effectiveness of insecticide spraying is erratic—desired control may not be achieved, particularly with chlorpyrifos.

Short-needled varieties of Scotch pine such as Southern French, Turkish, or others from west or south Eurasia appear to be less susceptible to this insect than other varieties. This insect can fly, but

fields more than 1/2 mile away are unlikely to be attacked. Rotating to a nonpine crop for at least 2 years should eliminate a present infestation.

Pine root collar weevil can obviously become a problem to nurseries and landscapes as well as Christmas tree farms. We are interested in knowing how widespread the problem is in Illinois. If you encounter this insect, please contact Phil Nixon or John Lloyd at (217)333-6650. (*Phil Nixon*)

BORERS

There are several ornamental plants in our landscapes that are susceptible to attack by borers. Lilac, ash, dogwood, birch, and several members of the *Prunus* genus are all favored by these pests. The damage is usually obvious to homeowners and other residents when entire plants or sections of them wilt and die. Upon close examination they find the tell-tale wounds or holes. Unfortunately, by the time they see the symptoms, it is too late to treat.

But what exactly is a borer? The lilac/ash borer is the larval stage of a clearwing moth that resembles a wasp. The adult moths emerge in midspring and over a 6-week period lay eggs in bark cracks of lilac, ash, or privet. The eggs hatch and the larvae begin to feed, destroying the vascular cambium, thus stopping the flow of water and nutrients within the plant. The larva overwinters in the plant, and the adult emerges in the spring to start the cycle over again.

Damage on smaller stems can produce dieback symptoms. Usually on lilac and privet, a whole stem will wilt, defoliate, and die. In trunks of ash, the girdling wounds cause changes in branch growth, structural weakening, and reduction in plant vigor. If the plant is in good health and not under any type of stress, such as poor growing conditions or disease problems, one infestation will not kill the entire plant. However, if infestation occurs every season, the plant will eventually be weakened so severely that it will die.

Control has to be timed to coincide with the flight of the adult moth. With the lilac/ash borer, this occurs when *Spirea x vanhouttei* is in full to late bloom. Once the larvae is inside the plant, very few controls will work. Lilac, ash, privet, and ornamental plum and cherry should receive their first spray at this time, with a follow-up spray 4 weeks later.

It is difficult to predict the exact timing of the adult flight due to weather variables. In addition to keeping an eye on Vanhoutte spirea, monitoring with pheromone traps will help with the timing of chemical applications. A pheromone trap has an attractant that

lures moths to it and traps them. Once you have trapped an adult, you are certain that emergence has occurred, and mating and egg laying will soon follow. Initial treatment should be 7 to 10 days later.

Borers are normally controlled with applications of chlorpyrifos (Dursban) at the time of egg laying or hatch. The timing of insecticide applications and the number of them depend on the borer involved. It is important that the borer be identified correctly before control efforts are attempted. There are also many borers that attack only highly stressed trees that will die whether or not borers are involved. Although the borers in these situations may cause the tree to die more quickly, expensive insecticide treatments may not be justified. (*Martha Smith and Phil Nixon*)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

NEWSLETTER

No. 6 • May 29, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Potato leafhopper continues to increase on red maple in the southern two-thirds of the state and treatments to prevent leaf damage should be applied (see issue No. 5 for treatment recommendations for potato leafhoppers and some other pests).

Oystershell scale crawlers of the brown race can still be controlled in central and northern Illinois while *Spiraea X vanhouttei* is in full to late bloom. The brown race primarily attacks apple, dogwood, and poplar.

Oystershell scale of the banded or gray race primarily attacks lilac, ash, willow, poplar, and maple. Crawlers are present when *Spiraea X vanhouttei* has just finished bloom, making treatment for these insects timely in southern and central Illinois.

Honeylocust plant bug has been found in northeastern Illinois. It is too early to determine whether numbers are high enough to cause the defoliation experienced in that part of the state last year.

Honeylocust spider mite has been reported in central Illinois. Treatment is probably not warranted at this time as damp, cool weather should help keep populations in check. Treatment is warranted once stippling and yellowing start to occur, particularly on trees close to reflective building walls and surrounded by hot, dry pavement.

Spruce spider mite is numerous in some areas of the state, including northeastern Illinois. Realize that high populations of this mite can cause severe foliar damage, dieback, and death of entire trees. Treatment is warranted, especially when populations are high.

Lilac/Ash borer treatment is necessary at this time as *Spiraea X vanhouttei* is in full to late bloom in central and northern Illinois.

Eastern tent caterpillar is over half-grown in northern Illinois and treatment can still prevent some defoliation. In southern Illinois, caterpillars should be fully grown and looking for pupation sites, making control ineffective. (*Phil Nixon, Fredric Miller, and Jim Schuster, horticulturist, Wheaton Extension Center*)

Pine Needle Scale

Pine needle scale attacks a wide range of evergreens including Scotch, mugo, and other pines; spruce, Douglas fir, and hemlock. It appears as white flecking on the needles and is a major pest in Christmas tree farms as well as landscapes.

Adult female scales are pure white, 1/8 inch long, widened toward the lower end, and varied in shape and width depending on the needles they are on. Males are also white but about half as long and parallel-sided with a prominent central lengthwise ridge.

Eggs overwinter under the old females and hatch into red crawlers that turn light yellow as they mature. This hatching occurs in the spring when *Spiraea X vanhouttei* is blooming. Although the scales soon settle down to feed, both the first (crawler)- and second-stage nymphs are susceptible to insecticides.

There are two generations of pine needle scale per year. The second generation produces crawlers during the summer when *Hydrangea arborescens* 'Grandiflora' blossoms are turning from white to green.



Insecticide sprays applied at this time also provide effective control. The eggs hatch over a longer period of time due to variability in scale development during the summer; a second spray should be applied 7 to 10 days after the first summer crawler spray.

Another scale species, the pine scale, can also be present in the same area as pine needle scale. Although their appearances and life cycles are similar, crawlers may not appear at the same time for both species. In situations where timely pine needle scale treatments have not provided adequate control, pine scale may be at fault.

To determine pine scale crawler appearance, check for crawlers weekly through the growing season, and treat when they are present. An easy way to scout for crawlers is to apply electrician's black tape, sticky-side-up, to infested branches. The crawlers will get stuck on the tape and can easily be seen against the black background.

Insecticides that are effective against these scales include acephate (Orthene), malathion, diazinon, chlorpyrifos (Dursban), insecticidal soap, and summer spray oil. (*Fredric Miller and Phil Nixon*)

Cankerworm

Cankerworm has been reported in northern Illinois. This caterpillar is most common on elm, honey locust, and crabapple. Scout for cankerworm by sharply striking a branch. Many of the cankerworms will drop from the foliage on silk threads so that population size can easily be estimated. Another method for determining cankerworm is to look closely at crabapple and other trees that appear to be leafing out slowly. Many of these trees are leafing out on time, but their leaves are being eaten by cankerworms.

There are two species of cankerworms, but both feed as caterpillars in the spring. Fall cankerworms emerge as moths from pupae in the soil in late fall, typically from mid-November into December. Spring cankerworms emerge as moths in very early spring or late winter; they are commonly found in late February to early March. Both species lay eggs on the host tree branches and hatch into caterpillars shortly after leaf emergence in the spring.

Cankerworm caterpillars "loop" or "inch" when they move. They have fewer prolegs—fleshy leg-like structures on the end of the abdomen—than typical caterpillars. This results in their moving by stretching out the body and grabbing hold with the true legs just behind the head. Then they let go with the prolegs and grab the leaf or branch with the prolegs, bringing

them forward just behind the true legs. The intervening, long, legless abdominal area loops up above the rest of the body. Then the true legs release their hold and the caterpillar stretches its body out to grab onto the branch or leaf, completing its own looping and unlooping action.

Fall cankerworm caterpillars have three pairs of prolegs, whereas spring cankerworms have two. Both species feed on the edges of tree leaves, eating the entire leaf in heavy infestations. Because they feed in the spring during leaf emergence, a heavy infestation can eat the leaves as they emerge; the result is a leafless tree for much of the spring. In late spring they enter the soil to pupate, and trees that have been attacked have time to releaf.

Cankerworms used to be more of a problem because of their fondness for American elm foliage. During outbreaks, entire communities of this overplanted tree would be essentially leafless into late spring. The demise of this species in most areas—from Dutch elm disease—has reduced the importance of cankerworm although high populations do occur occasionally, particularly in northeastern Illinois.

Control is easily accomplished with many insecticides. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) is very effective and has a lower impact on the environment than many other products. (*Phil Nixon and Fredric Miller*)

PLANT DISEASES

Fire Blight

The climactic conditions for the development of fire blight of Rosaceous plants (apple, crabapple, mountain-ash, firethorn, pyracantha, and about 70 other hosts) have been ideal this spring. Several factors, including the presence of open flowers, moderate temperatures during bloom, frequent rain/dew, and the potential presence of the causative bacterium, *Erwinia amylovora*, all contribute to the possibility of a severe fire blight problem. Bloom was extended this spring (19 days from first bloom to petal fall on apples); 13 wetting event days (rain or heavy dew) occurred during that time; and favorable temperatures (averages of about 65°F) forewarn of a potential epidemic. Whether an epidemic occurs depends upon whether inoculum was present during flowering and what kind of weather happens between now and late June. The severely cold January undoubtedly reduced overwintering inoculum, but recent strong southerly winds

may have reintroduced and redistributed the bacterium. Look for symptoms of blossom blight *now*. If blossom blight is present (even a single infected blossom cluster in a planting), then look for severe shoot blight in mid-June to mid-July, particularly if the current wet spring pattern continues and rains are accompanied by strong wind or hail.

Prune out blighted twigs in dry weather, 10 to 12 inches below any sign of infection. Pruning tools must be sterilized between all cuts. Either 10 percent Clorox or rubbing alcohol will work. Fertilization at this time of year is not recommended because the resulting succulent new growth is susceptible to further fire blight infection. Chemicals are often used in commercial planting but are only effective during bloom. For more information on fire blight, consult *Report on Plant Diseases* bulletin No. 801. (Steve Ries and Nancy Pataky)

Bacterial Soft Rot of Iris

There are many diseases of irises, and one of the most destructive is bacterial soft rot caused by *Erwinia carotovora*. It results in a soft, mushy, foul-smelling decay of the rhizomes, lower leaf sheaths, and bases of the flower stalks. The bacteria enter the plant through wounds, especially those made in the young leaves by larvae of the iris borer. Once the bacteria enter the leaves, they multiply rapidly and tissue is quickly destroyed. Dark green water-soaked streaks may appear, originating at the wound. The infected leaves usually die back from the tips, or they may wilt and eventually collapse as the disease progresses toward the rhizome. The disease will reach the rhizome unless the infected leaves are cut off and removed from the site. If rhizomes are infected, the inner tissue becomes rotted and foul smelling, and the outer skin remains intact. The soft rot disease is most common and serious in older iris plantings in wet, heavy soils or shady locations.

Erwinia overwinters in soil and decayed plant material. Both abundant moisture on the foliage (common this year) and fresh wounds are necessary for infection. The bacteria are commonly introduced into the iris plant by the feeding of the iris borer, and they remain constantly present in the feeding tunnels of the borers throughout the growing season.

Report on Plant Diseases bulletin No. 633 discusses this disease as well as others of iris. Control suggestions are detailed in that report. Collect and destroy all infected plant parts as they appear, but do not disturb iris plants when they are wet. Severely

diseased plants should be dug up and removed, along with several inches of the surrounding soil. Do not place diseased material in compost piles. It is too late to control iris borers for this year. One chemical application is made in April when leaves are only 5 to 6 inches tall. Consult page 177 of the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Peach Leaf Curl

The Plant Clinic has begun to receive samples and questions about this disease. The last time we saw significant amounts of peach leaf curl was in 1993, another year with a cool, wet spring. Hosts include peaches, nectarines, and *Prunus* species. Commercial orchards generally include a dormant fungicide spray in their routine, and this is all that is needed to control the disease. For this reason the disease is usually seen in the landscape or home orchards.

Peach leaf curl causes very obvious symptoms of leaf puckering, distortion, and thickened, crisp growth. The leaves curl downward and inward within a month after full bloom. The leaves are often red or purplish rather than the normal green. Later, the upper leaf surface is covered with a grayish white velvety spore layer.

The causal fungus (*Taphrina*) infects in cool, moist weather of early spring, from bud swell to bud opening (its ideal temperature is 50° to 70°F). Expect to see this disease soon.

Peach leaf curl may cause the first set of leaves to drop, but the tree will produce new leaves that should be disease free due to the warmer temperatures at bud break. The disease is unlikely to kill a tree, but fruit production and quality may be reduced. Homeowners can help their trees by maintaining fertility and watering as needed. The idea is to keep vitality high so that the tree can put out new leaves.

A single dormant fungicide spray would have controlled this disease. Chemicals are listed on page 77 of the *1996 Illinois Urban Pest Management Handbook*. Usually, the recommendation is to spray once in late fall or 3 to 4 weeks before buds swell in early spring. Since the disease cannot be controlled once the fungus enters the leaf, using fungicides at this point in the season will not help. Consult *Report on Plant Diseases* bulletin No. 805 for more on peach leaf curl. (Nancy Pataky)

Scorch or Anthracnose?

Since we have received calls about both scorch and anthracnose on trees lately, we want to clarify a few

facts about these conditions. The cool, wet conditions of most of the spring have created an ideal growing environment for the anthracnose fungi. Recent heat spells have pushed along leaf emergence and resulted in plenty of new, lush, fresh, tender foliage.

Noninfectious leaf scorch occurs whenever water cannot be translocated to the foliage rapidly enough to replace lost moisture. The causes vary and include root injury, root rot, poor soil conditions, high winds, transplant shock, flooding, and drought. Generally, scorch causes a necrosis of leaf tissue at the margins of leaves. In severe cases it may kill branch tips. If scorch occurs on very new growth, the foliage will probably turn black. Recently, we have had reports of blackened tips of leaves at ends of branches, uniformly spread over the entire tree. This is scorch. The condition is not infectious and does not need to be treated. The necrotic tissue will fall off the leaves as it dries. If winds are strong, leaves may develop a tattered look. Do not despair; there is no permanent damage. If drought occurs, keep the tree well watered. A report on scorch of woody plants is available as *Report on Plant Diseases* bulletin No. 620.

Anthracnose was discussed in issue No. 4. Anthracnose is a general term which describes many leaf-spotting and canker-forming fungal diseases. Many of you are familiar with the brown, scattered spots that are common with anthracnose or even the necrotic blotches that may occur. Anthracnose may also cause elongated lesions or dead areas on the veins. Recent sightings of this veinal anthracnose, without accompanying spots, have been reported on maple. In wet spring conditions, veinal anthracnose may be blackened and confused with scorch. In both cases, however, treatment is targeted on improving tree vitality, and fungicides are not recommended. (Nancy Pataky)

HORTICULTURE

Yellow Nutsedge

Yellow nutsedge emerged this week in central Illinois. Yellow nutsedge is a perennial grasslike plant whose

three-sided stem and yellow-green color make it easy to distinguish from round-stemmed grasses. Proper identification is essential since many of the grass herbicides do not control sedge.

Nutsedge reproduces from seed and underground tubers and can quickly take over a landscape bed. The tubers make nutsedge hard to control; even systemic herbicides like Roundup have a difficult time penetrating the tubers sufficiently to stop their resprouting.

Nutsedge typically grows best in moist areas and therefore may be especially prolific this year. Control it early. Hand pulling or cultivating is time consuming and not totally effective. Pennant is a preemergence herbicide that will control the germinating nutsedge seed. Basagran is a selective, postemergence herbicide labeled to control nutsedge (among other weeds) and can be used on many ornamental plants. (Rhonda Ferree)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

No. 7 • June 5, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Controlling Algae in Ponds

I have received several calls recently concerning the control of algae, particularly filamentous algae, on ponds; therefore, I will focus here on algae control measures. Please refer to the *1996 Illinois Urban Pest Management Handbook* for additional information on controlling other types of aquatic vegetation.

Algae are simple plants without true roots, leaves, or flowers. Three major types of algae are microscopic algae (blooms or scums), filamentous algae (dense free-floating or attached mats of green, hairlike strands), or Chara ("leaves" in whorls along a hollow stem).

Algae control includes chemical control measures (described below) and nonchemical measures. Nonchemical control options should be considered for long-term maintenance and include depth maintenance, nutrient control, mechanical removal, and possibly the use of bacterial agents and aeration. Typically, an integrated program that uses several methods of control is best.

Shallow pond depth is typically a primary problem when filamentous algae are present. As the filamentous algae photosynthesize, oxygen bubbles become trapped in the mats, causing them to rise to the surface. Mats are most noticeable around the edges or along the bottoms of ponds or the shallow portions of lakes. Areas less than 2 feet deep are the critical spots.

Ideally, a body of water should have an average depth of at least 10 feet, with a 1:3 shoreline slope.

Elevated water-nutrient level can enhance the development of soupy-green looking water. Although elevated nutrient levels in the water can allow filamentous algae to grow faster, shallowness is the major reason the algae mats are visible and problematic. The main nutrient concern is phosphorus, and this affects only the plants such as algae and duckweed that obtain their nutrients directly from the water.

Mechanical control physically removes the vegetation. The filamentous algae and other aquatic vegetation can be raked from the water's edge manually or with mechanized equipment.

There are many bacterial control agent products coming out on the market. Adequate research has not been done on them at this time. Typically, these bacteria work by degrading accumulated organic matter from the water column, thus reducing nutrient levels available for the algae growth. However, the key to getting these to work is adequate aeration in the water body. Most of the products need a complete system that adds oxygen to the water in order to work adequately. At this point I am wary of these products since no scientific data validate their use. It is a "buyer beware" situation.

Aerators add to the aesthetic values of the water feature but typically do very little for weed control. Sometimes they help add oxygen to the water—which helps natural occurring organisms "eat up" organic matter more quickly—but generally they only move the materials around the water's surface.

Chemical control is achieved using copper products such as copper sulfate or copper chelate. Copper products have no restrictions; thus, the water can be used immediately following application. Always follow label directions closely. There are a few variables that can cause the product not to work



adequately. Coppers are contact products that need good coverage to achieve adequate control. For this reason, liquid formulations that are sprayed directly onto the filamentous mats work better than granules in the water. The granules usually work on microscopic algae problems or for the filamentous algae on the bottom. Often, the algal mats need to be broken up somewhat to allow the spray to penetrate more area. Additionally, if the water is very alkaline, the copper sulfate will precipitate quickly and fall to the sediment without contacting the algae. If this is the case, copper chelates such as Cutrine-Plus, Komeen, Kocide, or others work better. In copper chelates, the copper is held in an organic molecule that results in less precipitation.

Coppers work best if they are applied on a bright sunny day when the algae are photosynthesizing prolifically. Light tends to increase the activity of these products. If they are working, the algae will turn yellow or whitish in 3 to 4 days. Even with a good initial kill, retreatment will be necessary once or possibly twice more each season. The contact activity of these products simply does not last long enough for full-season control.

Two more herbicides are labeled for some algae control: diquat and hydrothal. Diquat will suppress spirogyra (green slime) and pithophora (horsehair clumps). Since there are restrictions on some uses of the water following application, the label must be checked carefully. In addition to spirogyra and pithophora, hydrothal also controls cladophora (cotton mat type). It also requires repeat applications throughout the season and has some restrictions on use. Liquid hydrothal is a restricted-use pesticide, but the granule is not. (*Rhonda Ferree*)

INSECTS

Scouting Report

Katherine Weis, a graduate of the Ornamental Horticulture program at the University of Illinois, is the new IPM scout at the Morton Arboretum. She reports that cankerworm and honeylocust plant bug are still causing damage in the Chicago area.

Reports of European pine sawfly infestations continue to trickle in throughout Illinois. Damage may still be preventable in northern counties; however, most colonies in central and southern Illinois have finished their feeding. Eastern tent caterpillars are still active north of Kankakee. They are fat and

sassy but can still be controlled with insecticides to prevent further defoliation.

Oystershell, pine needle, and euonymus scales should still be in the susceptible crawler stage in most northern counties in the state. If *Spiraea X vanhouttei* is in full to late bloom, you still have an opportunity to catch the crawlers with an insecticide. This is also the time to initiate treatments for bronze birch borer and ash/lilac borer.

Moth captures in lesser peachtree borer pheromone traps are leveling off in southern Illinois. This may indicate peak moth catch in the area. Treatments with chlorpyrifos (Dursban) should begin a week after peak moth catch. This clearwinged moth is a pest of many ornamental plants, including purple-leaf plum, peach, almond, and flowering cherry. We will keep you updated.

False Japanese beetles have been defoliating plants in northwestern Illinois. We generally find these beetles in areas with sandy soils. The defoliation is similar to that of the Japanese beetle, except that it occurs earlier in the year and is not as widespread. The false Japanese beetle is similar in appearance to the real one, but it does not have the white hairy spots along the side of the abdomen. Acephate (Orthene), carbaryl (Sevin), and diazinon provide control.

Whitemarked tussock moth is active in southwestern Illinois. Chris Pierce, Alvey Labs, brought in for identification some caterpillars that were feeding on sycamore. This insect is widely distributed in the eastern United States and feeds on maple, birch, apple sycamore, poplar, linden, elm, and rose. Whitemarked tussock moths overwinter as eggs and emerge from May through June in Illinois. Newly hatched larvae skeletonize the leaves of their host but begin to chew the leaf fully as they mature. The caterpillar will measure slightly over an inch in length when mature, and has a reddish orange head and a yellowish body tufted with distinct hairs. It has 4 distinct white patches of dense hair on its back. We usually see 1 to 3 generations per year. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) will provide control.

Additional management information can be obtained in the *1996 Illinois Urban Pest Management Handbook* available through University of Illinois Information Services (217)333-2007 (*John Lloyd, Tom Royer, Katherine Weis, Phil Nixon*)

Scale Insects

Scale insects appear as blobs on leaf and stem surfaces. As mature females, these sucking insects with

resistant outer coverings are legless and eyeless. The outer covering makes them relatively resistant to insecticide sprays.

Eggs hatch into tiny, saltgrain-sized nymphs with 6 legs, 2 antennae, and 2 eyes. These nymphs, called crawlers, do not have any protective covering and are thus susceptible to insecticide sprays. Depending on the species, they may be bright yellow or red, making them easily visible on the plant despite their small size. Several important species, however, have grayish crawlers.

Crawlers act as their name suggests, crawling around on foliage looking for a place to settle down. They are the primary dispersal stage for scales. They may crawl onto the feet of perching birds and hitch a ride to a new host plant where they crawl off and try to establish themselves. Scale crawlers will also stand on their heads to get to another plant. They will crawl to a high, windy spot on the plant and raise abdomen and back legs into the air. Wind gusts will blow them off the plant and occasionally to another plant where they can feed.

After crawling around on the plant for about 10 days, they settle down on the plant to feed and molt into the second nymphal stage. As they develop and molt to older stages, they tend to lose their legs, eyes, and antennae, and develop a protective covering. Armored scales produce a separate waxy protective layer, whereas soft scales produce a thickened, hardened body wall and do not secrete a separate covering. Examples of armored scales include pine needle, euonymus, oystershell, and obscure scale. Lecanium, Fletcher, magnolia, and cottony maple scale are examples of soft scales.

Soft scales tend to produce large quantities of honeydew. Honeydew consists of plant sap that has had much of the water removed by the gut of the insect and is excreted through the anus as a clear, syrup-like material that is shiny and sticky. This honeydew coats leaves, stems, and objects beneath attacked trees such as sidewalks, picnic tables, and cars. There is a black sooty mold that will grow on the honeydew. Attacked trees can be easily noticed by their black branches caused by the sooty mold growing on the honeydew. Armored scales do not produce honeydew.

Unlike armored scales, soft scales tend to keep their legs through much of the life cycle, making some slow movement possible. For example, cottony maple scale crawlers settle in large numbers on silver

maple leaves but move back onto the branches in late summer before leaf drop. Because scale insects remain on the plant year-round, they are always found in temperate regions on plants with above-ground perennial parts. On deciduous woody plants, they will spend the winter on the stems, but the scales commonly overwinter on the leaves of evergreen plants such as pine, spruce, and euonymus.

Scale insects are difficult to control because they are relatively resistant to insecticidal control for much of the year. Crawlers are easily controlled by contact insecticides such as malathion, acephate (Orthene), diazinon, insecticidal soap, and summer spray oil. Several species of crawlers do not form a protective coat very quickly and are susceptible to contact sprays after they have settled down and molted out of the crawler stage.

Other stages of scale insects, except for the egg stage, can be controlled with oil sprays, with higher oil concentrations that are applied during the dormant season the most effective. This was discussed earlier this year in issue No. 1 of this newsletter. Systemic insecticides are usually not very effective against scale insects because the insecticide circulates through the plant and concentrates in the young foliage. Most scale insects are found totally or in large numbers on the branches where the insecticide is usually not concentrated enough to provide control.

Because control usually depends on treating the short-lived crawler stage, it is imperative to know when it is present. Because most scale crawlers are present in mid-spring, calendar timing is not precise due to early and late springs. Plant phenology is used in this newsletter as a more exact timing method, even though nothing substitutes for crawler observation.

It is suggested that crawlers be scouted at least semi-weekly during the time of year that specific crawlers should be present. Visually inspecting the foliage and branches is effective. Wrapping electrician's black tape around branches with the sticky side out will trap crawlers and is a useful scouting tool. Inspecting overturned adult scale insects with a hand lens or microscope will indicate whether eggs are present and whether they have hatched. With many scales, hatched crawlers will remain under the old female's scale cover for a few days before becoming active. This provides an effective early warning system for control applications. (*Phil Nixon*)

PLANT DISEASES

Oak Leaf Blister

Peach leaf curl and oak leaf blister are closely related diseases. Both are caused by a *Taphrina* fungal species, and both occur under similar environmental conditions (a cool, wet spring). Peach leaf curl was discussed in issue No. 6 of this newsletter. Because the Plant Clinic has recently received samples of oaks infected with this fungus, a discussion on symptoms follows.

Young, partially grown oak leaves develop circular, raised, wrinkled, yellowish white spots on their upper surfaces, with yellowish brown to gray depressions of the same size on the corresponding lower surfaces. The "blisters" later turn reddish brown and finally dull brown with age. Severe disease may cause some premature defoliation. Heavy infection levels may cause oaks to be unsightly but do not endanger the life of the trees.

No controls are usually suggested for this disease. Collecting and composting or burning the leaves as they drop may help in reducing the inoculum for next spring. You might notice that the *1996 Illinois Urban Pest Management Handbook* lists some fungicides that have been registered for control of oak leaf blister. We question the need, but in severe cases the use of fungicide may be desired. Sprays must be initiated before buds open (before you see the disease), so spraying this year would no longer be effective in controlling the disease. Fungicide use in this case is entirely preventive. For more information, consult *Report on Plant Diseases* bulletin No. 663. (Nancy Pataky)

Stem Blight of Vinca Minor

Vinca minor may be better known to some growers as periwinkle or ground myrtle. This ground cover may have problems in cool, wet weather with a fungal disease called stem blight. Newly planted beds, where plants have not become established, seem to be most susceptible to attack.

Symptoms first appear as dark brown to black girdling lesions on the stems of overwintered runners. When lesions occur at the ground line, the entire runner dies. Where healthy stems touch the soil or infected plant parts, new lesions may develop. Within a few weeks, the disease can spread to stems and leaves, causing large sections of the bed to die.

Infection by the causal fungus (*Phoma*) usually occurs between 50° and 65°F. As long as cool, damp

conditions occur, the disease spreads in the planting. The spores of the fungus are disseminated primarily by splashing and flowing water. Clearly, this spring has been ideal for stem blight of vinca.

Because this fungus can survive in the soil on dead plant material, removal of fallen leaves and dead tissue is important. Avoid overwatering or excessive overhead irrigation. Improving air circulation in the bed may help. To achieve this, it may be necessary to prune or thin nearby plants.

In new plantings, some growers have success with the following system. Mulch with 6-mil black plastic, perforated every 4 to 6 inches with a sharp object and covered with pea gravel or rough ground corn cobs. This protection promotes rapid establishment of plant root systems, reduces weed competition, and keeps stems off the soil where infection could occur. Be certain that the soil is well drained before planting. If you have a tight soil, consider using one of the newer types of ground cover materials that allow better air exchange with the soil.

Chemicals that may give some disease control are Domain FL and the copper compounds (such as Kocide, Champ, and Champion). There may be others listed under general purpose fungicides produced by home-owner-oriented companies such as Fertilome or Ortho. Remember to carefully read the label to be certain that the chemical you are choosing is registered for use against stem blight on vinca. Off-label use of fungicides is illegal, even for a homeowner. For more information on stem blight, consult *Report on Plant Diseases* bulletin No. 640. (Nancy Pataky)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental science, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

No. 8 • June 12, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Leaf Spots of Turf

The *Helminthosporium* types of leaf spots on turf have been reclassified over the last 10 years and are now referred to as species within the genera of *Bipolaris*, *Drechslera*, and *Exobasidium*. These fungi have been active this spring and may be found on all turfgrasses in Illinois. The symptoms will vary depending on the fungal species, the grass species, the weather, and cultural conditions. In general, look for small spots or lesions varying in color from reddish brown to purplish black. The centers are often tan, and the lesions typically have a reddish brown border, giving an "eyespot" appearance. In wet weather the lesions may merge, yellowing the turf or producing a tip dieback. Although the leaf spots may not cause extensive injury, the disease may progress into the crown area in hot summer weather. The crown rot or melting-out phase of the disease can cause death of large areas of turf. Controlling the leaf spot diseases is important in prevention of the melting-out disease.

The leaf spot diseases are favored by dry periods alternating with prolonged, cloudy, moist weather and moderate temperatures. The disease progresses quickly when grass is cut too short, turf is slow growing, or fertility is low; and where there is excessive shade or excessive nitrogen use.

Cultural control measures are usually effective in controlling the leaf spot diseases. In cases for which such measures are not adequate, chemical controls may be used as protectants. Chemicals labelled for use in Illinois are listed on pages 12–13 of the 1996 *Illinois Urban Pest Management Handbook*.

The most important control measure at this time of year is proper mowing. Mow all turfgrasses at the recommended maximum height for the species. Mow frequently enough so that no more than 1/4 to 1/3 of the leaf surface is removed at one time.

It is also important to fertilize your lawn without letting the nitrogen become excessive. This disease is one that will be suppressed with proper fertilization. Turf specialist Tom Voigt (333-0350) has some guidelines on fertilization of turf.

The most lasting control of this disease can be obtained using resistant varieties. More information is available in *Report on Plant Diseases* No. 405, but work closely with your seed dealer because availability of the seed will also be a factor in variety selection. (Nancy Pataky)

Dogwood Anthracnose

The wet and cool conditions of this spring may have some people concerned about dogwood anthracnose. Dogwood anthracnose has devastated dogwood populations in parts of the eastern and northwestern United States, and the disease has been reported by our neighbors in Indiana, Missouri, and Kentucky. It most likely occurs in Illinois as well but has not been confirmed by the Plant Clinic. The disease is unlikely to have devastating effects in Illinois because summers are generally less wet and humid than in the East and Northwest. Also, flowering dogwoods are more common along the edge of wooded areas and in partially shaded areas where more open conditions enhance leaf drying and impede disease development.



Dogwood anthracnose is easily confused with spot anthracnose, a more common dogwood problem in this area which usually does not cause significant decline or death of dogwood trees. Spot anthracnose only infects leaves, young shoots, and fruit. Dogwood anthracnose causes leaf spots and stem cankers, and may kill shoots. Infected trees decline and die if untreated. Leaf symptoms of dogwood anthracnose are medium-large spots with purple borders, which may spread and kill entire leaves. Dead leaves often remain attached to branches for several weeks. Spot anthracnose leaf symptoms are very small (pinhead-sized), red-purple spots with yellow centers. If you suspect leaf symptoms resemble dogwood anthracnose, examine larger branches for cankers by peeling back the bark in infected areas. Look for twigs dying back, especially in the lower crown. Under very humid conditions, infected leaves and twigs produce tiny fruiting bodies with masses of spores.

Spot anthracnose usually does not require fungicide sprays for control, unless conditions remain favorable for prolonged periods. Dogwood anthracnose is difficult to control once it has caused significant dieback. Maintain optimum conditions for growth and recovery: water during dry periods, mulch around trees to reduce watering needs, avoid overhead irrigation, and improve air movement around trees to minimize infections and encourage drying of foliage. Prune and discard infected branches and shoots. Rake up fallen leaves. Avoid high nitrogen fertilization which promotes succulent branching. Dogwood trees should not be planted in sites with dense shading. (Lindsey du Toit)

Coniothyrium Leaf Spot of Yucca

The Plant Clinic has recently received several calls and one sample of yucca with extensive spotting of leaves. The disease identified is caused by a fungal pathogen called *Coniothyrium*. Spots appear as circular to elongated light brown areas with purple edges. The center of each spot is a pale brown or tan and has many pinhead-sized black pycnidia arranged in a circular pattern within the spots. These pycnidia are the spore-bearing structures of the fungus.

Avoid watering plants from above. When possible, water the soil rather than the foliage. The spores are easily spread with water, so the rains we have experienced have been a very efficient vector of this pathogen.

Control recommendations that we can find include cutting off and destroying infected leaves. If this

means removing the entire plant, don't do it. Try removing only heavily infected leaves. Spray with a copper compound or Bordeaux mixture to protect healthy areas. Yuccas are not extremely common in the landscape, and chemical recommendations are few. A search of labels led to Cleary's T/O. This chemical is registered for use on yucca, but information on efficacy does not seem to be available. Two copper products, Champ and Champion, are also labeled for use on yucca, but they do not specifically list *Coniothyrium* leaf spot as a target. These products also warned of foliar discoloration on some varieties as a result of spraying. Fertilome has a product called Blackspot which contains copper hydroxide. This is cleared on yucca as well. This may be the cheapest and easiest product for homeowners to use. Let me know if you find something better on the market. (Nancy Pataky)

Bacterial Spot of Pepper

This disease was identified recently on peppers in the central part of the state. According to University of Illinois vegetable pathologist Darin Eastburn, the hard, driving rains we have experienced recently helped to disseminate pathogens from plant to plant and soil to plant, as well as to create small wounds on leaves and stems that can serve as sites of infection. In areas receiving heavy rains, growers should be especially watchful for bacterial diseases. Eastburn also warns that the prevalence of bacterial spot on peppers and tomatoes, bacterial speck on tomatoes, angular leaf spot on cucurbits, black rot on crucifers, bacterial blights of snap beans, and other bacterial diseases may increase following heavy rains.

Bacterial spot appears as small, circular spots on the leaves. The spots may get as big as 1/4 inch in diameter; are usually dark brown, with lighter brown centers; and often have a yellow or water-soaked border. The water-soaking symptom is easiest to see by holding a leaf up to the light and looking at the underside of the leaf. Affected leaves have a ragged appearance; and, if the spots are numerous, the leaf drops off. If you see many leaves on the ground under the plants, then a bacterial spot epidemic may already have started. Bacterial spot may also show up on tomatoes, though leaf spots may be smaller, darker, and less circular.

Copper-based materials (or copper plus maneb) are available for bacterial spot control. Eastburn emphasizes that applications must be made at the first sign of disease to be effective. These chemicals are not

effective in clearing up an established epidemic. Watch pepper plants carefully, and begin treating as soon as you notice the spots on the leaves. *Report on Plant Diseases* No. 910 discusses bacterial spot. (Nancy Pataky)

INSECTS

Scouting Report

Bronze birch borer and **ash/lilac borer** insecticide applications can still be applied. It is time for the second applications of chlorpyrifos (Dursban) for both borers in southern and central Illinois. First applications of Dursban to control bronze birch borers can still be applied in northern Illinois. Throughout the state, dimethoate (Cygon) concentrate bark banding will still be effective.

Viburnum borer treatments of chlorpyrifos (Dursban) should be applied now when mockorange is in bloom and repeated in 3 weeks. Apply the insecticide heavily to the base of the trunks so that the insecticide runs along the trunks at the soil line. This insect attacks at the base of the branches, just below the soil surface. *Viburnum opulus* 'Compactum', European cranberrybush viburnum, is the most frequently attacked although other viburnums are also susceptible.

Honeylocust plant bugs are adults in central Illinois and should be a mixture of nymphs and adults in northern Illinois. Control efforts can still be effective, but make sure that numbers are high enough to warrant control—at least one bug for each compound leaf.

Lecanium scale crawlers are likely to be out in southern Illinois. Experts are unsure whether lecanium scale is a complex of several closely related species or one species that is very variable. In either case, crawlers may emerge on one plant several weeks after those on another. This makes it important to check infested plants throughout June and to treat only those with crawlers.

Bean leaf beetles are destroying bean plants in many home gardens. The problem is worse this year because farmers are late getting their soybeans planted. These 1/4 inch long, nocturnal beetles overwinter as adults and eat the leaves of newly emerged beans. In agricultural areas, the overwintering beetles from several hundred acres may attack a 30-foot home garden plot and completely consume the crop if there are no other beans around. Carbaryl (Sevin) or rotenone treatments are effective controls.

To prevent this problem in the future, plant garden beans after the area's soybeans have been planted.

Mosquitoes continue to be a problem throughout the state. The main species present is the inland floodwater mosquito, a vicious biter but not a human disease carrier. This mosquito emerges as an adult about 15 days after a heavy rain under warm conditions. If one plots these heavy rains, it is easy to predict when biting will be a problem.

Additional management information can be obtained in the *1996 Illinois Urban Pest Management Handbook*. (Phil Nixon)

Plant Health Care and IPM: Hands-On Training for Practitioners in the Midwest

The University of Illinois Cooperative Extension Service, Purdue University Cooperative Extension Service and the International Society of Arboriculture (ISA)—in cooperation with the Illinois Arborist Association, Indiana Arborist Association, and Illinois Department of Natural Resources (DNR)—are presenting a 2-day workshop at The Morton Arboretum in Lisle, Illinois, on July 12 and 13, 1996.

This 2-day workshop is co-sponsored by the ISA as a pilot for future Plant Health Care (PHC) hands-on training workshops throughout the world. Experts from the University of Illinois, Purdue University, South Dakota State University, Morton Arboretum, Dow Gardens, U.S. Forest Service, Illinois and Indiana DNR, and many other allied organizations, agencies, and companies are involved with the workshop. This pilot program will become a base from which the ISA will develop advanced certification for PHC Practitioners.

South Dakota State University's John Ball, world-renowned PHC expert, will address the opportunity of PHC, the concept, and putting the concept into practice. Additionally, Midwest experts in arboriculture, urban forestry, horticulture, plant pathology, entomology, and zoology will provide integrated training teams for "How to Do PHC" field and laboratory sessions. A large portion of the workshop will be devoted to these field and laboratory sessions to increase knowledge of the tools and skills necessary to develop and maintain productive PHC programs.

The student: instructor ratio will be approximately 6:1. Enrollment is limited to 100 on a first-come first-serve basis. For registration information, contact Julie Ruffalo at the Illinois Arborist Association, (708)960-5922. (John Lloyd)

Leaf Beetles

Important leaf beetles on trees in Illinois include elm leaf beetle, willow leaf beetle, and imported willow leaf beetle. Control of these insects with carbaryl (Sevin), rotenone, diazinon, or other insecticides is most effective during June when the larvae are present. Besides chemical insecticides, the bacterial toxins of *Bacillus thuringiensis* 'San Diego' and *B.t.* 'Tenebrionis' sold as M-One and Trident are effective against the young larvae.

Elm leaf beetle adults are yellowish with a black stripe along the edge of each wing cover and about 1/4 inch long. They feed heavily on Siberian and American elm but feed only lightly on Chinese elm. They are most numerous in the southern two-thirds of the state.

Willow leaf beetle adults are reddish with black spots on the wing covers. They are also about 1/4 inch long. As their name suggests, they feed on various species of willow. They are found primarily in the southern two-thirds of the state.

Imported willow leaf beetle adults are also about 1/4 inch long but are metallic bluish-black. They also feed on various species of willow. They are found in the northern half of Illinois.

Adults of these three species overwinter under loose bark and in other protected sites. They emerge in the spring to eat holes and notches out of leaf margins of their host plant. In June, they lay clusters of yellow to yellowish-green eggs on the undersides

of the leaves. These hatch into black spiny larvae that feed on the leaf underside, leaving the upper surface intact. The upper leaf surface dries and turns brown, greatly reducing the aesthetic value of attacked trees. The larvae pupate and emerge as adults that continue to feed on the leaves.

In Illinois, the imported willow leaf beetle usually has one generation a year. Willow leaf beetle usually has two generations; and elm leaf beetle, three generations in southern Illinois. (*Phil Nixon*)

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HORTICULTURE

Hail Injury

Hail has caused considerable damage to many plants this spring. The wind velocity and direction and the type of plant all play a role in the kind of injury and severity of injury. In general, hail can cause defoliation, tattered leaves, injured bark, damaged and fallen fruit, and broken twigs and small branches. Tattered leaves are common on larger leaved plants such as hosta, whereas woody plants might have slits in the bark. Hail typically causes the greatest damage at the top of plants and on the windward side.

On woody plants, hail is often most injurious to young trees or those with undeveloped foliage in the early spring. Areas in the bark and cambium might be severely bruised or even killed from the impact of the hailstones. When bark injuries do not callus over rapidly, they often serve as entrance points for wood decay fungi. If this occurs, cankerlike damage can be found a year or two later.

Practice good horticulture by providing proper fertilization and water. Clean the wound by cutting away stripped bark or similar injury, if possible. In most cases, there is little you can do but keep the plants healthy so they will heal faster. (Rhonda Ferree)

Why Aren't My Annuals Blooming?

Some people are wondering if their annuals, such as petunia and geranium, are ever going to grow and flower this year. Several botanical reasons explain why this cool, wet spring has resulted in improper flowering. Floral initiation is largely influenced by the plant's environment, particularly nutrition, light, and temperature. In rainy weather, the production of carbohydrates is reduced to a level that is too low to provide the balance necessary for flowering. This, coupled with inadequate sunlight and cool temperatures, results in slow shoot and root growth and poor phosphorus uptake. Fortunately, warmer, drier, brighter days are around the corner, and so are the blossoms of our favorite annuals. (Rhonda Ferree)

INSECTS

Scouting Report

Eastern tent caterpillar is still feeding in northern Illinois. The larvae are ranging from half to fully grown. They can be controlled by hand removal or with insecticide sprays.

Birch leafminer is producing young mines in northeastern Illinois. Where damage has been severe in the past, treatments should be made with sprays of dimethoate (Cygon, De-Fend); acephate (Orthene); azadirachtin (Azatin, Margosan, Bioneem); imidacloprid (Merit); or chlorpyrifos (Dursban). Banding with dimethoate concentrate is also labeled, but be careful to avoid contact with the insecticide both during application and while it is drying. The band should be placed on the white bark in a width that equals the trunk's diameter, but no wider than 6 inches. Birch leafminer tends to be more severe in protected locations. It also appears to prefer cool,

damp springs, so this year's infestation might be severe. Damage is most severe in northern Illinois.

Aphids are being noticed throughout the state on a variety of trees and shrubs. Avoid treatment unless populations are high and there are few natural enemies such as lady beetle larvae or adults, lacewing larvae, or aphid mummies. Most aphid populations crash on their own due to predation.

Potato leafhopper continues to occur on red maples. Be watchful for damaging numbers, and treat when necessary to avoid tip damage.

Lecanium scale scouting for crawlers needs to continue throughout southern and central Illinois. Crawler emergence might not begin in northern Illinois until late June due to the prolonged spring.

Euonymus scale crawlers should still be present in northern Illinois, and settled crawlers should still be controllable in central and southern Illinois.

Oystershell crawlers continue to be present in northern Illinois. The gray or banded form of oystershell scale had some crawlers still active in central Illinois as of June 11. Treatments on settled crawlers should still be effective in at least central and northern Illinois.

Annual white grub adults have been observed in the soil. It is anticipated that the prolonged cool weather will delay their emergence. Adults typically emerge in the last week of June in southern Illinois, early June in central Illinois, and mid-June in northern Illinois. If soil moisture remains high, there will likely be little need for control this year. However, hot, dry weather for the next three weeks might bring out the adults sooner and concentrate their egg laying in irrigated turf. (*Phil Nixon, Tom Royer, Jim Schuster, and Katherine Weis*)

Bagworms

Bagworm eggs have begun to hatch in southern Illinois. Bagworms overwinter as eggs in the previous year's female bags. Once the larvae emerge from the egg, they crawl out of the bottom of the female bag, and begin to spin a silk case and attach plant material around themselves. While young, they tend to crawl to the top of the plant and suspend themselves with a single strand of silk. A strong breeze will catch them and carry them to other plants. Because the female moth has no wings, this is the principal way that they disperse. As the caterpillar continues to feed, the bag grows with the caterpillar. This bag protects the worm from natural enemies (and pesticides, to an extent).

Bagworms feed on many plants but are common on arborvitae, juniper, cedar, pines, spruces, and a number of deciduous trees. They will feed for several weeks before pupating. Male moths are winged and will emerge in the fall to search for the wingless females that remain in their bags. The male mates with the female, and she essentially turns into a container for the 500 to 1,000 eggs that she produces.

Early management of bagworms is essential for effective control. Old bags can be removed before the eggs hatch in low-lying shrubs. Young bagworms can be effectively controlled with *Bacillus thuringiensis* 'Kurstaki' (Dipel, Thuricide) or with acephate, carbaryl, or malathion. It is best to delay an insecticide application for a week or so after the first tiny bags are noticed so that one spray will control the infestation. As the bags become larger, they are more difficult to control, so it is important to carefully examine plants for the first signs of bagworm feeding. Consult the label for suggested rates. (*Tom Royer*)

Sawflies

Several species of sawflies feed on conifers in Illinois. They all appear as groups of caterpillar-like larvae with seven or more prolegs (false legs on the abdomen) and large black or red heads. They are about 1 inch long when fully grown.

Most common is the European pine sawfly, which is still present as larvae in northern Illinois. These larvae are grayish green with dark stripes and large black heads. They feed on the older needles of Scotch, mugho, and other pines. They emerge early in the growing season; thus, they do not feed on the emerging candle. Heavy feeding damage results in the loss of the older needles, but the tree survives due to the untouched, new needles.

Later occurring sawflies are uncommon in Illinois but can be more destructive because they will eat all of the foliage from branches, resulting in the death of those branches or completely stripped trees. Introduced pine sawfly is being found on eastern white pine in southwestern Illinois. Although white pine is the favored host, it will also feed on Scotch, jack, red, and Swiss mountain pines. The larvae are blackish with rows of orangish yellow spots down the sides. They have black heads. There can be two generations per year, with the second generation occurring in September. They occur sporadically in Illinois.

Red-headed pine sawfly is very destructive, having been reported previously in mid- to late summer in northwestern and southwestern Illinois. These larvae

are yellowish white with red heads and six rows of black spots running the length of the body. They feed on jack, red, and Swiss mountain pines. They can also attack eastern white pine, larch, and Norway spruce.

The white pine sawfly also occurs in mid- to late summer in northwestern Illinois. The larvae are pale yellow with a black head and four rows of black spots running the length of the body. They can strip eastern white pines and have two generations per year.

Although sawfly larvae look like caterpillars, they are actually related to wasps. The adults are wasplike in appearance and usually 1/2 to 1 inch long. Because they are not true caterpillars, *Bacillus thuringiensis* 'Kurstaki' is not effective against them. They are usually controlled with sprays of carbaryl (Sevin); diazinon; azadirachtin (Azatin, Bioneem); acephate (Orthene); or chlorpyrifos (Dursban). Because they feed in groups, particularly when young, the larvae can easily be removed by hand or by pruning. (*Phil Nixon, Tom Royer, and Jim Schuster*)

PLANT DISEASES

Verticillium Wilt

The *Verticillium* fungus can infect many different plants in many different plant families. The host range includes trees, shrubs, ground covers and vines, vegetables, field crops, fruits, herbaceous ornamentals, and even many weeds. The most common *Verticillium* cases at the Plant Clinic involve maple, redbud, cotoneaster, magnolia, and ash. For a more complete list of potential hosts, refer to *Report on Plant Diseases* No. 1010.

Symptoms of this disease include wilting, yellowing, and death of the leaves of affected branches. Often only one branch or section of a plant is affected at first. Symptoms might eventually spread over the entire plant. Because many factors can cause these symptoms, it is very important to look for a diagnostic brown or dark-green discoloration of the vascular tissue appearing as a streaking of the wood just under the bark. It can be seen when the bark is peeled back with a knife; or it might appear deeper in the stem and can be seen in a stem cross section as a ring (or partial ring) of discoloration. Be sure to check all the way around an affected branch to be certain that you have not missed the discoloration. It is best to check a branch that has symptoms, is still alive, and is about as thick as your thumb. If laboratory confirmation is desired, send branch sections as described and about 6 to 8 inches long. Samples can be cultured in the lab to isolate the causal fungus.

Verticillium wilt is caused by the *Verticillium* fungus. It produces toxins that cause gums to form in the water-conducting tissues. The result is reduced water to the foliage, and eventually the foliage is killed as with severe drought stress.

There are no chemical controls for *Verticillium*-infected plants. Control measures that we can recommend target cultural practices instead. Prune as much of the dead tissue out of the plant as possible. Try to help the tree regain vitality by keeping it well watered and fertilized. Because the fungus primarily moves up the tree, and the vascular tissue is produced horizontally, some species of woody plants can grow quickly enough to "wall off" the fungus. For this reason, the disease might be contained in one section of the tree. If the tree is stressed, the fungus might spread to the rest of the tree.

It is important to know whether a tree or plant is infected with this fungus if replacement plants are considered. The fungus is soilborne and will infect other susceptible plants in the same site. The *Verticillium Report on Plant Diseases* lists some plants that are not yet known to host this fungus.

One final, but vital, fact to consider is that infected plant material should not be composted or chipped and used as mulch around other plants. Some preliminary research in Minnesota showed that *Verticillium*-infected wood chips used as mulch resulted in infection of mulched plants. (*Nancy Pataky*)

Ash Decline

The Plant Clinic has received many questions about ash trees over the past several years. One common problem encountered is discussed here.

Ash decline, or ash dieback, is a devastating disorder of ash trees found mostly in north-central and northeastern parts of the United States. It is characterized by loss of vigor over a period of 2 to 10 years before the trees die. Symptoms include short internodes and tufting of foliage at branch ends. Leaves become pale green to chlorotic and might develop fall colors prematurely. The tree might defoliate, and the canopy appears sparse. Cankers form on branches and the trunk, and twigs and branches die back. Witches'-broom sprouts of growth might appear on some branches. It is seldom that ash trees recover, but they might respond to favorable environmental conditions with vigorous growth during early stages of decline.

A full understanding of the cause of ash decline still remains uncertain. Initially, the main cause of ash dieback was thought to be environmental because no

pathogens could be associated with the condition other than opportunistic canker-causing fungi. Incidence and severity of dieback seemed greater during drought periods, so water shortage was often blamed as the cause of ash decline. However, dieback has also been observed in young ash trees without any water shortage. The latest understanding of ash decline is that it is caused primarily by mycoplasma-like organisms (known as MLOs), and symptoms are enhanced by drought stress, freeze damage, and opportunistic pathogens. Green and red ash are affected less severely than other ash species.

Diagnosis of ash decline is difficult because it is dependent almost entirely on symptoms that could be caused by a variety of other problems. We cannot test for the presence of MLOs at the Plant Clinic, so we must rely on an accurate description of symptoms as well as photographs of the affected tree. Verticillium wilt on ash causes similar symptoms of dieback and decline. It is important to discern whether the problem is Verticillium wilt because this disease affects such a wide variety of tree species and dying ash trees should not be replaced with species susceptible to Verticillium wilt. Refer to the Verticillium wilt article on page 3 for further information. (*Lindsey du Toit*)

Oak Wilt

Oak wilt, caused by the fungus *Ceratocystis fagacearum*, has become widely publicized in Illinois in recent years. Once a tree is more than 5 percent infected, there is no cure and the tree will die within one to several years. The fungus invades the vascular system of oaks through wounds or root grafts between healthy and infected trees. It reproduces in the vascular tissue, blocking movement of water and nutrients from the roots to the foliage. This leads to wilting and ultimately death of the tree.

Symptoms of oak wilt vary depending on the type of oak. Oaks in the red-black group are most susceptible and usually die within a year of infection. Leaves in the crown and at the tips of lateral branches discolor and wilt. By late summer, an infected tree usually has few leaves still attached. Oaks in the bur-white group are more resistant, taking longer to succumb to the disease. Leaves on scattered branches become discolored and wilt, usually remaining attached to the tree. The tree might survive for several years, showing a staghead appearance. Infected oak trees develop green to brown-black discolored streaks in the sapwood beneath the bark.

The symptoms of oak wilt can be caused by a wide variety of other problems such as anthracnose, soil

disturbance or compaction, nutritional disorders, extremes in water availability (drought or flooded soils), and so forth. Such problems might also stress oak trees so that they are more susceptible to oak wilt. It is important to verify whether the symptoms are caused by oak wilt because the disease spreads very easily to neighboring trees. An infected tree will act as a source of inoculum for surrounding trees unless it is cut down and the wood destroyed. The fungus is spread from infected trees by root grafts, pruning tools, and various insects.

To determine whether the problem is oak wilt, the pathogen must be cultured onto laboratory media from symptomatic branches. This can be done at the Plant Clinic. Cut several 6- to 8-inch-long sections from branches that are 3/4 to 1 inch in diameter and alive but showing symptoms. The fungus cannot be cultured from dead wood. You can check for vascular discoloration by peeling back some of the bark with a knife, but do not remove all of the bark from the samples. Cut sections from different parts of the tree showing symptoms as the pathogen is usually scattered in various sections of the tree. Culturing for oak wilt requires at least 7 days in the laboratory before the fungus can be identified.

The oak wilt pathogen appears to be most infectious in spring or early summer, so pruning should be delayed until late summer or fall to avoid infection through pruning wounds. Pruning during the growing season causes sap exudate at wounds. This sap attracts beetles that can spread the fungus to healthy trees. If a tree is diagnosed with oak wilt, remove and destroy (burn or bury) the wood immediately. For more information on oak wilt, consult *Report on Plant Diseases* No. 618. (*Lindsey du Toit*)

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Major authors are Phil Nixon and John Lloyd, (217)333-6650, Fredric Miller, (708)352-0109, and Tom Royer, (618)692-9434, entomologists; Nancy Pataky, plant pathologist, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217)333-0350. Phil Nixon is executive editor of the Home, Yard and Garden Pest Newsletter. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.

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HOME, YARD & GARDEN PEST

NEWSLETTER

No. 10 • June 26, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Potato leafhoppers have made their annual migration up from the Gulf of Mexico throughout central Illinois and Indiana in spite of the cool weather. Scouts from Cliff Sadof's IPM program at Purdue University are finding potentially damaging numbers of leafhoppers on red maples. In Illinois leafhoppers are present, but populations appear to be below damaging levels. Probably, the cool, wet weather is delaying development and increasing disease incidence in the leafhoppers. The key to control is to apply insecticides prior to the time that they curl the leaf. Sadof's rule of thumb is to spray when you see an average of one hopper per shoot when you sample plants. Other options include replacing red maple varieties with those that have been crossed with silver maples. According to entomologist Dan Potter of the University of Kentucky, many of these hybrids have good fall color and are less susceptible to this pest.

We are still hearing scattered reports of **honeylocust plant bug**. Populations are much lower, and damage is accordingly less throughout the state than in 1995. Treatments can still be applied in northern and some central areas of Illinois if populations are high enough on individual trees (at least one bug per compound leaf) to cause leaf distortion.

Spittlebug nymphs are present on arborvitae and other plants throughout the state. Spittlebug nymphs

produce frothy bubbles from the abdomen that they spread over their bodies, resulting in a mass of white spittle. The insects feed on plant sap but usually cause little damage. Twig and branch dieback can occur when high numbers are present. Pine spittlebug attacks scotch, jack, and white pines as well as spruce and hemlock, and causes more severe damage when present in lower numbers. Controlling spittlebugs is easy once the spittle is penetrated. Using forceful sprays of malathion, diazinon, and other insecticides is effective. Many professionals knock the spittle off with heavy water sprays before spraying with insecticide.

Fletcher scale (*Taxus lecanium* scale) crawlers have settled in the Collinsville area, according to Don Orton of the Illinois Department of Agriculture. Although this scale's crawlers are whitish and easily seen, once settled they molt to an essentially transparent form that is difficult to see without carefully turning the specimen in the light. Control should still be effective in this early-settled stage.

There are still young colonies of **European pine sawfly** on scotch pine in northern Illinois. We still appear to be several weeks behind normal phenology (relation of temperatures and biological development) in northern Illinois. With this in mind, we should rely on scouting to determine when we should treat for pest problems.

Pheromone traps placed at the Morton Arboretum late in the week immediately caught male **ash/lilac borers**. These clearwinged moths have not reached peak numbers in the north but are peaking in southern and south central Illinois. Treatments should be applied approximately a week after peak moth catch on the trunk of susceptible plant materials with a residual insecticide such as chlorpyrifos (Dursban) or lindane. Plants in stressful conditions and with mechanical damage are more attractive and susceptible to clearwinged borer damage.



Conifer spider mites, which prefer cool seasons, are diminishing with the recent warm temperatures in central and southern Illinois. Damage is still occurring in the north on spruce. When looking for spider mites (bad guys), also look for the predaceous mites (good guys) that are eating them. Predaceous mites tend to move faster than their prey. If damage is occurring and pest populations are high and natural enemies (predaceous mites) low, treatment may be necessary.

Please see the *1996 Urban Pest Management Handbook* for additional management recommendations for these and other insect pests of ornamental plants. (John Lloyd, Phil Nixon, Fred Miller, and Katie Weis)

Periodical Cicadas

This year's emergence of periodical cicadas in certain areas of the country is getting a lot of press coverage, causing people to become concerned about a potential emergence in Illinois this year. This year's emergence is Brood II, which extends from eastern New York and Connecticut south through Virginia and North Carolina. There are spotty outlying emergences in north-central Pennsylvania, northern West Virginia, southeastern Indiana, and southwestern Michigan. This area includes New York City and Washington, D.C., possibly the two cities with the highest number of reporters in the world, which helps explain the news coverage.

We are not expecting an emergence of periodical cicadas in Illinois this year. In 1997, Brood III will emerge in Henderson, Warren, Knox, and Fulton counties as well as parts of Mercer, Schuyler, Brown, and McDonough counties. It will also emerge in parts of Champaign, Piatt, and DeWitt counties. These cicadas last emerged in 1980.

In 1998, Brood XIX will emerge and cover most of the southern half of Illinois. This brood will cover Hancock, McDonough, and parts of Iroquois, Ford, and Livingston counties. It will also cover all of Illinois south of a line from Champaign to Springfield to Quincy, except for the extreme eastern counties of Vermilion, Edgar, Clark, Crawford, Lawrence, and Wabash, and the extreme southwestern counties of Massac, Alexander, Union, and Jackson. This brood last emerged in 1985.

A few emerged periodical cicadas were reported in southern Illinois a few weeks ago. It is common to have a few cicadas emerge 1 to 2 years before a major emergence. Periodical cicadas typically emerge in early May in southern Illinois and mid-May in central Illinois.

In these areas where cicada emergence will occur, it is recommended that you avoid planting very small trees where cicadas were very numerous in previous emergences. Cicadas do little feeding as adults but lay their eggs in slits that they make in twigs and branches. Branches up to 1-1/2 inches in diameter are usually attacked. Heavy egg laying weakens these branches, causing them to break off in heavy winds. In whips and small transplants with small trunk diameters, this egg laying can cause the trunk to snap. (Phil Nixon and Noel Troxclair)

When Prediction Models Go Awry

I have yet to experience the typical year of weather in Illinois. The old timers tell me to hang in there and I'll eventually live through a typical year, but 1996 isn't it. In previous articles it was mentioned that the primary tools used in scouting are your eyes, and 1996 has shown that these tools are the most reliable in your arsenal. Calendar dates are certainly off center throughout the state this year; additionally, our degree day and plant phenological indicators appear to be a little ahead of schedule for some common landscape pests. By most measures and indicators, oystershell scales should be finished with the crawler stage at this point; however, many are still producing crawlers. Other insect events are also behind schedule as we indicated in the scouting report.

Prediction models have been used for insect control since the advent of the Gregorian calendar and prior to that when ancient humans correlated insect events with moon cycles. (This is not as strange as it sounds, as some scientists have recently correlated locust migrations with sunspot activity.) In more recent times, with the use of computers, we have attempted to refine prediction models using temperature. Since insects are "cold-blooded," they rely on temperatures around them to become active. By correlating temperatures with insect activity and development, we create Degree Day Models to assist us in predicting when insect activities will occur. Another avenue using the idea of temperature-dependent development for plants as well as insects has resulted in prediction models that correlate plant phenological events with insect events.

The basic premise behind these temperature models is that insects and plants have a base (lower threshold) temperature at which they will become active or begin developing. An across-the-board estimate for most insects is about 50°F. To determine when a particular insect event will occur, we begin accumulating "degree days" from the time the ambient air temperature

reaches 50°F until the insect reaches the number of degree days necessary for the event to occur. For example, if on a certain day the high temperature is 72°F, the insect will have accumulated 22 degree days (72 minus 50) for that day. It may take 500 degree days for the event we're waiting for to occur.

These models are effective as long as the temperatures do not hover near the base temperature for an extended period of time. Temperature is not the only factor that influences insect development. When temperature hovers around 50°F, it ceases to be the predominant factor, and other factors such as microclimate (the temperature and humidity immediately adjacent to the insect) and enzymatic activity begin to play roles in the insect's development that are much more difficult to predict. A similar situation occurs when using plant phenology to predict insect events. The temperatures that influence plant activity are generally close enough to induce insect activity; hence, the nice correlations that are available in Don Orton's book, *Coincide* (published by White Oak's Group, Flossmoor, Illinois). However, when we have the cool temperatures hovering around the lower thresholds for both the plant and the insect, the discrepancies in their developmental thresholds can be intensified, resulting in the differences we are seeing this spring.

When it comes to pest management in the landscape, these prediction models will help us by pointing out when we should begin scouting for certain pests. They are not—and should never be used as—a replacement for actually observing the pest in an active scouting program. (*John Lloyd*)

PLANT DISEASES

Rose Rosette Disease

Rose rosette has shown itself in Illinois for several years. This disease has become well-known in research centers but may not be recognized by all rose growers. Rose rosette disease is believed to be caused by a double-stranded RNA, which means that it is a virus-like disease. Unfortunately, then, it cannot be cultured in the lab, and most labs depend on symptom expression for diagnosis.

Symptoms are quite distinct. The new growth appears deep red, both on leaves and stems. Leaves may show crinkling, distortion, or a mosaic of green, yellow, and red. An infected plant produces numerous lateral shoots that grow in different directions, giving

the plant a witches'-broom appearance. These shoots are typically deep red and much larger in diameter than the canes from which they grow. Thorns on these stems are more numerous than normal. Plants usually die within about 22 months of infection.

The vector of this disease is an eriophyid mite, so small that 20 could fit on a pinhead. The disease can also be spread by grafting.

Multiflora rose is the most common host of this disease, but it has been reported on cultivated flowering varieties. Climbers, hybrid teas, floribundas, miniatures, and a number of "old-fashioned" roses have been infected. So far, no other host besides rose has been found.

Currently, infected plants cannot be salvaged. Plants with symptoms should be dug up and destroyed (including roots) when first noted. It is strongly suggested that multiflora and garden roses be separated as far as possible from each other. The efficacy of mite control has been questioned in control of this disease. If miticides are used, research suggests that the critical mite transmission time is May and June; concentrate your efforts in those months.

Hybrid teas typically show a color that is more yellow than red. For details of this disease, consult *Report on Plant Diseases* bulletin No. 666. (*Nancy Pataky*)

Powdery Mildew

This fungal disease is fairly easy to identify in the field, and early detection may prompt fungicide controls in cases for which the disease is a regular deterrent to growth. Now is the time to look for powdery mildew on ornamentals.

The powdery mildew diseases affect woody and herbaceous ornamentals as well as vegetable, cereal, and fruit crops. These fungal diseases are easy to identify, due to the characteristic white to light-grayish powdery growth found primarily on leaves. Because these fungi flourish when days are warm to hot, nights are cool, and dew forms on foliage, you can expect to see powdery mildews soon. They will be most severe on crowded plants in shaded locations, or where air circulation is poor.

After the initial symptoms of a white, powdery growth, powdery mildew may cause stunting, curling of leaves, chlorosis, premature leaf drop, and deformation of flower buds. In most ornamental plantings, the damage is primarily aesthetic. An example is lilac, as shown on picture sheet "Woody Ornamental Diseases I." With fruit crops such as apple, however,

there may be twig damage, fruit loss, or loss of fruit quality. (See note at end of "Plant Diseases" section.)

Unlike most fungal diseases, powdery mildew is not as destructive when rains are frequent. High relative humidity (but not rain) is needed for spores to germinate, and mildew develops rapidly in extended periods of warm, dry weather when morning dews are heavy. Ideal disease conditions are 90 to 99 percent relative humidity at temperatures of 66° to 72°F.

Whenever possible, homeowners will want to look for cultivars resistant to mildew. Pruning diseased wood (especially on rose and crabapple) during the normal pruning period greatly reduces overwintering inoculum. Try to prune plants to allow better air circulation, and never handle infected plants when they are wet. As usual, plants should be maintained in high vigor to withstand disease attack.

Fungicides can control powdery mildew fungi in a preventive mode of action. Sprays must be initiated when the disease first appears, usually in early July.

Home fruit growers should follow the schedule for the specific host in the *1996 Illinois Urban Pest Management Handbook*. Fungicides can be used on a preventive basis on various ornamentals, as outlined in Chapter 4 of the same handbook. Powdery mildew is discussed on various ornamentals in *Report on Plant Diseases* bulletin No. 617. (Nancy Pataky)

Dollar Spot

Dollar spot infects creeping bentgrass, Kentucky bluegrass, annual bluegrass, and fine-leaf fescues. Even Bermuda grass and zoysia grasses can become infected.

As the name implies, the disease appears as more-or-less round spots about the size of silver dollars. These spots become brown, straw-colored, and somewhat sunken. On lawn grasses the spots may enlarge to as much as 4 to 8 inches in diameter.

A quick diagnostic guide for this disease involves the appearance of the leaf lesions. Plants that grow at the edges of the affected area show lesions (spots) on the blades. The lesions girdle the blade, may be up to 1 inch long, and are usually bleached white to light tan, with a dark-brown, reddish brown, or purplish border. When dew is present on the blades of grass on overcast days or early in the morning, a white cobwebby growth of fungal mycelia may be seen on infected plants.

Control measures for this disease include maintaining balanced fertility (disease is worse when nitrogen is low); avoiding late afternoon or evening watering; providing good air circulation in the area by pruning surrounding plants; providing adequate surface drainage; mowing at the maximal height; and using a turf cultivar resistant to at least some strains of the dollar-spot fungi. Resistant lines are suggested in *Report on Plant Diseases* bulletin No. 407. Chemical controls are available on a protective basis but are generally used only on golf courses. Details are available in the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Brown Patch

Brown patch commonly appears in hot, muggy weather when night temperatures are at least 70°F and daytime temperatures are in the 80s and 90s (as we have experienced). It is favored by heavy rains or watering and by grass that is at least adequately fertilized and dense. The disease appears as patches, up to 2 or 3 feet across, where turf is light brown (see the picture sheet "Turfgrass Diseases," No. 5—see note below). It shows up best during wet weather, but the turf will not be matted.

Brown patch can be prevented by using cultural practices listed in *Report on Plant Diseases* bulletin No. 411. If the disease occurs, chemicals may keep it from spreading, but long-term control requires following cultural recommendations. Chemical controls are listed on page 15 of the *1996 Illinois Urban Pest Management Handbook*. Read the label carefully for recommended formulations, rates, and timing for your particular turf conditions. Because such applications usually require sprays at 5- to 14-day intervals throughout the summer, fungicide control of brown patch is usually reserved for golf courses. Also, products are not always available in quantities suitable for the homeowner's use. (Nancy Pataky)

Note: The picture sheets "Woody Ornamental Diseases I" and "Turfgrass Diseases" were distributed with previous years' newsletters. The picture sheets can be ordered through Vocational Agriculture Service, 1401 S. Maryland Drive, Urbana, IL 61801, (217)333-3871.

HORTICULTURE

Choosing Chemical-Resistant PPE

Personal protective equipment (PPE) information is found in the "Precautionary Statements" section of pesticide labels. Within that section, most labels now have a PPE section detailing the minimum amount of protective clothing that applicators and other handlers (including mixers and loaders) must wear.

The amount of PPE required varies with toxicity and type of exposure. Generally, as toxicity increases, more PPE is required. The minimum requirements typically coincide with signal words. A low-toxicity product with a CAUTION signal word may require only long-sleeved shirt, long pants, socks, shoes, and possibly chemical-resistant gloves or eyewear. WARNING signal word products may add to the above items a coverall (basic cotton type) over short-sleeved shirt and short pants, chemical-resistant

footwear, and possibly a respirator. Highly toxic products with a DANGER signal word would increase this protection by keeping the WARNING items but adding the coverall over a long-sleeved shirt and long pants.

Some people are confused by the term *chemical-resistant*. The term used here refers to items that the pesticide cannot pass through during the time it takes to complete the task. Labels may list examples of PPE materials that are highly chemical-resistant to the product, such as barrier laminate, butyl rubber, nitrile, or viton. You may choose PPE items made from any of the materials listed on the label. Pesticide labels will sometimes specify using a chemical-resistance category (A through H) for the product. This allows you to consult an EPA chemical-resistance chart (shown below) to learn whether you have PPE material options other than those listed in the examples on the label. (Rhonda J. Ferree)

EPA Chemical-Resistance Category Selection Chart

Selection category	Barrier laminate	Butyl rubber	Nitrile rubber	Neoprene rubber	Natural rubber	Poly-ethylene	Polyvinyl chloride	Viton
A	high	high	high	high	high	high	high	high
B	high	high	slight	slight	none	slight	slight	slight
C	high	high	high	high	moderate	moderate	high	high
D	high	high	moderate	moderate	none	none	none	slight
E	high	slight	high	high	slight	none	moderate	high
F	high	high	high	moderate	slight	none	slight	high
G	high	slight	slight	slight	none	none	none	high
H	high	slight	slight	slight	none	none	none	high

High: Highly chemical-resistant. Clean or replace PPE at end of each day's work period. Rinse off pesticides at rest breaks. **Moderate:** Moderately chemical-resistant. Clean or replace PPE within 1 to 2 hours of contact. **Slight:** Slightly chemical-resistant. Clean or replace PPE within 10 minutes of contact. **None:** No chemical resistance. Do not wear this type of material as PPE when contact is possible.

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HOME, YARD & GARDEN PEST

NEWSLETTER

No. 11 • July 3, 1996

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PLANT DISEASES

Bacterial Wetwood of Trees

Many tree owners, especially residential growers, have been concerned about seepage from the trunk of trees. This condition is likely to be bacterial wetwood.

Bacterial wetwood, a water-soaked condition of wood in the trunk, branches, and roots of many shade and ornamental trees, is cosmopolitan in all older elms and both young and older poplars and cottonwoods. It also occurs in other tree species. In most trees, wetwood is normally not serious. As a chronic disease, it might contribute to a general decline in tree vigor, especially of older trees growing under stressful conditions.

Wetwood is most visible externally as a bubbling seepage from wounded tissue in V-shaped branch crotches, pruning wounds, injection holes, and trunk cracks. Internal gas pressure commonly reopens old wounds; the sour liquid is colorless to tan as it oozes out. Light or dark streaks occur where the gray to brown, foamy liquid flows down the bark. As it dries, a light-gray to white incrustation is left (slime flux). This toxic liquid commonly causes localized death of the cambium. Although fluxing occurs from April to December, it is most conspicuous during the summer.

Although there is no cure or preventive treatment, the following practices might be helpful.

Fertilize stressed trees in the spring to stimulate vigorous growth. The installation of perforated plastic or iron drain tubes relieves the gas pressure and allows continual drainage away from the tree. A disadvantage of drain tubes is that another deep wound is made, breaking the "compartment" the wetwood is in and thereby allowing the internal discoloration and any future decay to spread outside the wetwood-affected area. Removing dead and weak branches, plus promptly pruning and shaping bark wounds, is helpful. For more information, read *Report on Plant Diseases* No. 656, "Bacterial Wetwood and Slime Flux of Landscape Trees." Also refer to picture sheet "Tree Diseases II." (Nancy Pataky)

Canker and Dieback Diseases

Cankers occur on a great percentage of the woody plant material that comes through the Plant Clinic. They are generally secondary, or stress, pathogens, and only a part of the overall problem. They are merely a clue that something more is wrong. Still, they are the most conspicuous problem that can be sampled.

A canker is a dead area, usually on a woody plant, that often results in an open wound. Starting as a small, sharply delimited, usually round to oval or elongate lesion, a canker might enlarge and girdle the cane, twig, limb, trunk, or root.

Nearly all canker organisms are wound parasites. The death of the bark and underlying tissue is usually associated with a dead bud, branch stub, or twig, or with mechanical injury, and extends radially from the wound. When water-conducting tissue is blocked or killed, the most prominent symptom is gradual or rapid wilting, withering, and dieback starting at the shoot tip and progressing to a girdling canker below.



(When twigs and branches show dieback from the tip, the condition might be called a blight, with the pathogen directly invading the dead area.) Leaves on cankered parts are often smaller than normal, first pale green, then usually yellow or brown, and sparse.

Large or multiple trunk cankers might result in severe girdling and subsequent death of the affected tree or shrub. When a canker forms on the trunk near the soil line, it is called crown canker or collar rot.

Cankers might develop as conspicuous, slightly sunken or flattened areas of bark or as diseased areas that cannot be detected when you examine the bark surface. The diseased bark of sunken cankers often cracks within or at the margins, exposing the wood beneath. In other cankers, swollen ridges of callus form a targetlike area. On woody plants with light-colored bark, diseased bark that does not become depressed might turn a shade of brown or black. Such cankers are obvious because their color is abnormal.

Cankers can usually be seen as brown to black diseased areas just under the bark when the outer bark is cut away. Many cankers caused by fungi are indicated by raised, dark, fruiting bodies, speck-sized or larger, in the diseased bark. Many fruiting bodies break through the bark and appear as dark spots or bumps. Oozing of gum, resin, or sap is a common sign of certain cankers.

Canker and dieback diseases are most frequent and conspicuous on plants under stress from transplant shock: an excess or deficiency of water; prolonged exposure to extremely high or low temperatures; sudden hard freezes in mid- to late fall or spring; summer or winter sunscald; frost cracks; changes in the soil grade; mechanical injuries (for example, hail, wind, a heavy ice or snow load, lawn mowers, construction equipment or vehicles, squirrels and other rodents, insect borers, dogs, livestock, or deer); pruning wounds; root rot; nematodes; or improper digging, storage, and shipping. Cankers are also common in nurseries and plantations, where the plants are grown closely together.

Although most cankers are caused by fungi, a few are caused by bacteria, viruses, other pathogens, and noninfectious agents. *Report on Plant Diseases* No. 636, "Canker and Dieback Diseases of Woody Plants," lists many of these organisms.

Regardless of the particular pathogen involved, the treatment is the same. Try to determine the source of injury or stress and address that problem. Remove any dead wood or wood that is so badly cankered as to be undesirable or dangerous. There are no chemicals that will be of benefit. (Nancy Pataky)

Slime Molds and Fungi on Mulches

These growths suddenly appear after heavy rains or after watering in warm, muggy weather—even in gardens of the most avid gardeners. The slime molds are primitive organisms that flow over low-lying objects (mulches, even sidewalks and driveways) or vegetation (for example, turfgrasses, strawberries, bedded flowers, ground covers, weeds, and bases of woody plants). The organisms are not parasitic; they feed on decaying organic matter, fungi, and bacteria in the soil and the turfgrass thatch layer. During warm, moist weather, the slimy, amoeba-like stage flows over low-lying objects and appears as watery-white, gray, cream to light-yellow, violet, blue, green, or purple-brown greasy masses up to 1 to 2 feet in diameter. The amoeba-like stage soon turns into purplish gray, blue-gray, dirty yellow, white, or black crusty fruiting bodies filled with masses of dusty spores.

For abundant mold, you can break up the unsightly spore masses by vigorous raking, brushing, or hosing down with a stream of water. If you wait until the spore mass dries, it can then be physically removed from the site. Mowing the lawn usually removes the spore masses in turf. Chemicals do not provide control. Slime molds disappear with hot, dry weather. Refer to *Report on Plant Diseases* No. 401 for details.

Another fungal problem in mulch is called the artillery fungus. The fungus itself is not too noticeable, but it forms small, round spore bodies that are shot as much as a couple of yards. They stick to whatever they contact, and you might see these as small black spots on the side of your house, plants, or anything else in the way. The spots are very dark brown or black. These sticky spots are very difficult to remove, even with power washers. There is no chemical method of control. Some people recommend that you rake or "fluff" the mulch to disrupt the formation of spores and help the mulch to dry more quickly and make it less conducive to fungal growths. That is also our recommendation. (Nancy Pataky)

HORTICULTURE

Iron Chlorosis

There are a lot of yellow-leaved plants around this summer. There are many possible reasons for this, including iron chlorosis. More than 250 species of plants are susceptible to iron chlorosis, including pin oak, sweetgum, flowering dogwood, honey locust, silver and sugar maples, pine, privet, rhododendron, rose, spirea, sycamore, tulip tree, and willow.

Chlorosis is a yellowing of the leaf due to a lack of chlorophyll development. Iron—an essential element for plant growth—is required for the formation of chlorophyll and for the proper functioning of many plant enzyme systems. Iron chlorosis usually results in interveinal chlorosis of new growth. In severe instances, symptoms might include reduced twig growth, small leaves, and gradual dieback. The symptoms can be localized on only part of a plant.

Iron chlorosis is common in Illinois due to alkaline soils. Lime-induced iron chlorosis occurs in soils with a pH greater than 7.0. In a high-pH soil, iron is insoluble and not available for plant uptake, even if iron is present.

Proper identification is important because other problems can mimic iron chlorosis symptoms, such as moisture and temperature extremes, root damage, poor drainage, compacted soils, alkaline soil, inadequate light, some insects and diseases, herbicide misapplication or drift injury, and nutrient deficiency. Although iron chlorosis is often confused with zinc and manganese deficiencies, iron is an immobile nutrient; thus, symptoms appear on the youngest leaves first. Zinc and manganese deficiencies appear first on the older, basal leaves.

Available treatments are usually not long-term solutions because they often treat the symptoms, not the cause. Long-term solutions include modifying the soil pH, improving drainage, or using plants tolerant of high-pH soils. Typically iron chlorosis is managed by applying iron to the soil, directly to the plant as a foliar spray, or as a trunk injection or implant. The most lasting results are obtained by applying iron to the soil, which, when done properly, should be effective for up to 4 years.

Treatment methods are explained in detail in *Horticulture Fact Sheet* No. NC-3-80, titled "Iron Chlorosis of Woody Plants: Symptoms and Control," available for 25 cents from the University of Illinois, Department of Natural Resources and Environmental Sciences, 1201 S. Dorner Dr., Urbana, IL 61801. (Rhonda Ferree)

INSECTS

Scouting Report

Potato leafhoppers stayed small in number through the cool, rainy spring but greatly increased in number once the weather turned drier and hotter. Red maples are being severely attacked, and they are also present on red bud, crabapple, sugar maple, honey locust,

burning bush, and other trees and shrubs. Pyrethroid sprays such as bifenthrin (Talstar), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), and permethrin (Astro, Ambush, Pounce) are particularly effective for 2 to 6 weeks. Carbaryl (Sevin) is effective, but reapplication might be needed after a week. Scout trees for deformed, mottled tip growth showing fall coloration. You should be able to see the green, slender leafhoppers that are 1/8 inch long and shorter on the leaf undersides.

Earwigs are very numerous in northern and central Illinois this year. These insects are about 5/8 inch long and reddish brown, with large pincers on the end of the abdomen. They feed primarily on decaying organic matter and hide during the day in cracks and crevices. When homeowners find earwigs under loose tree bark, they assume that the insects have caused all sorts of harm to the tree, but earwigs are not known to cause tree or shrub damage. They strip the leaves and blooms of marigolds, zinnias, lilies, roses, and other flowers. Carbaryl (Sevin) sprays are effective controls, but do not spray the blooms. Earwigs will disappear in mid-August. Although commonly found indoors, earwigs lay their eggs in soil outdoors and will not reproduce indoors.

Bagworms continue to hatch in the southern two-thirds of the state. Spray once you no longer see the newly hatched 1/8 inch larvae. This indicates that egg hatching and windblown migration might be finished. Periodically scout trees that have been treated so that caterpillars resulting from late egg hatch or migration aren't allowed to cause damage.

We are getting reports of first-generation feeding of **fall webworm**, **yellownecked caterpillar**, and **white-marked tussock moth** from the southern half of Illinois. Fall webworm has only one generation in most of the northern half of Illinois, but areas from about Lincoln, Illinois, south have two generations per year. The second generation first appears in late August, the same time that the only generation occurs in northern Illinois. The other caterpillars have several generations in central and southern Illinois. Defoliation from the first generation of these caterpillars is more of a concern than with their latter generations. (Phil Nixon, John Lloyd, and Tom Royer)

Cecropia Moth

We had unusually high numbers of cecropia caterpillars last summer in Illinois. The resulting pupae that overwintered are now emerging as adult moths. Landscapers and arborists are likely to be asked about these huge moths and resulting large caterpillars.

Cecropias are found in the eastern half of the United States except for the southernmost areas. In Illinois, cecropias are almost absent from mature woodlands; they prefer newly settled suburban areas with small shade trees. Its preference for urban areas is simple—its major predator, the white-footed mouse, is absent. The house mouse, common in urban areas, cannot open the cecropia's cocoons; therefore, the pupae have a safe haven. Cecropia moth wings are 5 to 6 inches across, colored a dark red-brown with silver-gray lines and crescent-shaped markings.

Male moths will make a brief flight before dusk and then remain hidden until just before dawn, when they go in search of a female. Females, heavy with eggs, remain where they are. Just before dawn, the female will send out a pheromone, an airborne scent that will attract the males. Using the scent receptors on his featherlike antennae, a male will follow the pheromone trail until he locates the female. They mate and remain coupled until the following dusk. Shortly thereafter, the male flies away and will search for another female during the next near-dawn period.

The female moth, however, begins to lay large, oval, cream-colored eggs in groups of three to six. The first eggs are laid near where the female originally pupated. After laying this first group, she flies away and lays the remaining eggs on proper food plants far apart from each other to minimize competition for food among her caterpillars. Food plants include apple, white birch, white oak, black cherry, and several other tree species. The female lays about 350 eggs. The adult moths have a life span of only 5 to 6 days and do not feed.

The young cecropia larvae are black and covered with bristles, and, unlike their parents, they are eating machines. Because there are usually very few larvae per tree, the large number of leaves that each larva eats does not seriously impact the tree, and control is rarely needed. By late summer, the fourth and final instar larvae are large greenish caterpillars with four orange tubercles behind the head. Full-grown caterpillars can be 5 to 6 inches long and more than ½ inch in diameter. Full-grown larvae stop eating and descend to near ground level to spin cocoons among the stems of a shrub. Their cocoons, the largest woven of any moth, have three layers: a tough, leathery outer covering; a fluffy layer that suspends the inner within the outer layer; and an even tougher inner layer in which the pupae rest. The developing moths spend winter in their cocoons and emerge the following year. (Susan Post, Illinois Natural History Survey, and Phil Nixon)

Lace Bugs

According to *Insects that Feed on Trees and Shrubs*, by Johnson and Lyon, there are more than 27 species of lace bugs in the genus *Corythucha* that feed on deciduous plants. They tend to specialize on certain genera of plants. Some of the more common species in Illinois include the hackberry, hawthorn, oak, sycamore, and walnut lace bugs. These are true bugs and injure plants by feeding on leaf tissue with their piercing and sucking mouthparts. All species overwinter as adults in leaf litter, bark crevices, and other shelters in the landscape. Depending on species and location, one or more generations occur each year.

The hawthorn lace bug is common in Illinois and occurs throughout the United States. It feeds on various species of the rose family, including apple, cotoneaster, hawthorn, pear, and quince. Adults measure ⅛ inch long and have sculptured wings with brown patches that provide a lacy appearance. Adults emerge from overwintering sites and feed for several weeks. Eggs are laid on the underside of leaves in groups of 10 to 30 along the sides of prominent veins. Nymphs hatch and grow through five instars. Each instar is distinguished by the number and pattern of spines on its body. Development from egg to adult requires 4 to 7 weeks, depending on temperature. One or two generations probably occur each year.

Sycamore lace bugs become active as the leaves begin expanding in the spring. Adults overwinter under exfoliated tree bark. Females lay eggs in the pubescence of the leaf and attach them with a brown, sticky substance. Depending on location and year, two to five generations occur in Illinois.

Injury usually appears as a "stippling" or chlorotic flecking on the upper leaf surface, caused by nymphal and adult feeding. As time progresses and the nymphs grow, the leaf might take on a more general "mottled" appearance, and you can find black spots and discoloration on the underside of the leaf caused by excrement and cast skins. Lace bugs can be controlled with insecticidal soap or with acephate (Orthene), carbaryl (Sevin), or cyfluthrin (Tempo). (Tom Royer)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service. Major authors are Phil Nixon and John Lloyd, (217)333-6650, Fredric Miller, (708)352-0109, and Tom Royer, (618)692-9434, entomologists; Nancy Pataky, plant pathologist, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217)333-0350.

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

No. 12 • July 10, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Potato leafhoppers continue to cause leaf distortion on red maple, redbud, crabapple, sugar maple, honey locust, and burning bush. Scout trees for deformed, mottled tip growth showing fall coloration. You should be able to see the green, slender leafhoppers that are $\frac{1}{8}$ inch long and shorter on the leaf undersides.

Bagworms continue to hatch in the southern two-thirds of the state. Spray when you no longer see the newly hatched $\frac{1}{8}$ -inch-long larvae. This indicates that egg hatching and windblown migration might be finished. Periodically, scout trees that have been treated so that caterpillars resulting from late egg hatch or migration are not allowed to cause damage.

Lilac borer, also known as **ash borer**, continues to be present in pheromone traps in central Illinois. Treating the trunks of young ashes with chlorpyrifos (Dursban) is still recommended, particularly in northern Illinois. Recently transplanted trees that are yet to show strong yearly growth and recently pruned or damaged trees are more susceptible to borer damage.

Annual white grub adults have emerged in southern Illinois but had yet to emerge in central Illinois as of July 5. They typically emerge in central Illinois on July 2 or 3 and might be late this year due

to the cool, rainy weather earlier this spring. Observation of adult emergence along with the state of nonirrigated turf helps predict the likelihood of white grub damage. The recent spell of hot, dry weather is causing unwatered turf to go dormant, making the concentration of egg laying into irrigated turf more likely.

Black turfgrass ataenius larval damage has been reported in Ohio by David Shetlar, Ohio State University. This is also the time when first-generation larvae are approaching full size. Brownish areas of golf-course turf and other highly maintained turf can be caused by this insect. The beetle prefers damp areas, so even swales in suburban lawns might have this insect due to the wet spring weather. The offending insect is a $\frac{1}{4}$ -inch, C-shaped white grub with six legs. Treatment is the same as for annual white grub.

Sod webworm moths are flying throughout the state. In hot, dry weather, sod webworm larvae are more successful, and turf damage can occur. Damage appears as brownish turf areas that are caused by grass blades being eaten off close to the ground. (Phil Nixon, John Lloyd, Tom Royer, and Fredric Miller)

Fall Webworm

Eggs are laid by fall webworm moths in clusters on the underside of tree leaves. The eggs hatch into hairy, yellowish caterpillars with red or black heads and black spots. The caterpillars create a silk tent around the leaves on which they are feeding. The tent is enlarged to cover fresh leaves as the leaves are eaten every few days. Large tents with older caterpillars might be 2 to 3 feet long. Mature larvae drop to the ground to pupate and emerge as moths which again lay eggs to start the second generation.

Fall webworm will feed on more than 200 species of deciduous trees. The most common hosts for fall webworm in Illinois, however, are crabapple, hickory,



walnut, pecan, and maple. The first generation seems to prefer slippery elm, mulberry, sweet gum, redbud, and crabapple.

Physical removal is a valid option for controlling fall webworm because the caterpillars remain inside the tent to feed on the enclosed leaves. Tents containing caterpillars should be pruned off while they are still small. If the tents are large or out of reach, *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) and several other chemical insecticides will effectively control the caterpillars. Insecticides should be used with sufficient spray pressure to penetrate the silk tent and contact the leaves within it. (John Lloyd)

Yellownecked Caterpillar

Young yellownecked caterpillars were identified by Noel Troxclair, IPM educator, on paper birch in the Marion area. Caterpillars hatch from a group of eggs laid by a bland-looking moth and feed as a group on a variety of deciduous hosts, including crabapple, linden, oak, hickory, maple, and birch. Complete defoliation of the host tree is possible in severe infestations. Young larvae skeletonize leaves while feeding, whereas older larvae will eat the entire leaf.

The caterpillar's name is derived from the bright orange and yellow segments behind its head capsule. Young caterpillars are red with pale yellow lines running the length of their body. As the larvae mature, the red coloration turns black. When the caterpillars feel threatened, they exhibit a group defensive response—raising their heads and abdomens in the air in unison. This must give predators, such as birds, the impression that what they are attempting to eat is much bigger and more of a threat than the individual caterpillars.

Bacillus thuringiensis kurstaki (Dipel, Thuricide) is an effective insecticide for treating young yellownecked caterpillar larvae. Malathion, chlorpyrifos (Dursban), and acephate (Orthene) will also provide control. (John Lloyd)

Walnut Caterpillar

This caterpillar might be more of a problem in landscape situations where trees are isolated and defoliation is concentrated on the individual trees.

The life cycle of walnut caterpillars and the damage they cause are similar to yellownecked caterpillars. Moths emerge in spring, mate, and lay eggs on the underside of leaves. Young caterpillars skeletonize the leaves, and older larvae consume the entire leaf. The caterpillars feed in clusters and consume all of

the leaves, including the petiole, on one branch before they move to another. The caterpillars will molt (shed skin to grow) in unison and leave behind a mass of cast skins.

Early stages of the caterpillars are brick-red. As they mature, their coloration changes to black bodies with long white hairs. The larvae have a defensive behavior similar to yellownecked caterpillar. They raise their head and abdomen when disturbed to frighten away predators.

Chemical recommendations for walnut caterpillars are the same as for yellownecked caterpillars. (John Lloyd)

White-Marked Tussock Moth

First-generation caterpillars of white-marked tussock moth feed on the foliage of more than 50 species of trees. Young larvae skeletonize leaves, and older larvae eat everything except the main veins and petioles.

Larvae have a red-orange head and a yellow body with a black stripe and four tufts of yellow hairs on the back. Adult female moths are wingless and about 1/2 inch long, whereas males have a wingspan of about 1 inch. Tussock moth larvae can cause extensive defoliation but do not exhibit the gregarious feeding habit or the defensive response of the yellownecked caterpillars.

Management of tussock moth larvae with *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) is effective when the larvae are small. Malathion and carbaryl can also be used to control the caterpillars. (John Lloyd)

Japanese Beetles

Japanese beetle adults are being found in southern and central Illinois and will soon follow in northern Illinois. Linden trees, crabapple, grape vines, and Virginia creeper are all being skeletonized. However, activity appears to be down a bit compared to last year.

It's difficult to say why the Japanese beetle numbers might be less this year. Perhaps the life cycle of the Japanese beetle population got "stretched out" last summer (remember we had a mini-drought in August) and this spring (rain, rain, and more rain). Many of the grubs were still feeding in mid-June, a time when they should have gone deeper into the soil to transform into adults.

If this scenario is the case, then we can expect the adults to continue to fly and feed (at damaging levels) well into August. Of course, this could change if the

current hot and dry weather continues for an extended time. Hot, dry weather causes the adult beetles to feed and seek out green, grassy areas to lay eggs faster than when cool conditions prevail.

For control of adult Japanese beetles, we do not recommend using beetle traps. The traps attract more beetles into the area than would normally be present, and the traps capture only a fraction of the insects attracted. (My solution? Give the trap to a neighbor at the other end of the block!)

For those absolutely opposed to using pesticides, try to pick off the first adult beetles seen in the yard. These first scouts attract more beetles. If they are removed, the scouts in the neighbor's yard might call the rest of the beetles away. For disposal, drop them into a bucket or can of soapy water.

Sprays and dusts are still the most effective method of dealing with adult Japanese beetles. Carbaryl (Sevin), chlorpyrifos (Dursban), and acephate (Orthene) are the traditional over-the-counter pesticides. Professionals might wish to try the pyrethroids—lambda-cyhalothrin (Scimitar), bifenthrin (Talstar), and cyfluthrin (Tempo). They provide excellent knock-down and good residual control. There are also some reports that the insecticidal soaps are doing a credible job, though no residual effect remains after the spray has dried.

Because any insecticide control efforts against adult beetles will require several applications, treat only the plants that are being heavily attacked and are near entryways and other places in the landscape where the damage will be very noticeable. Untreated trees and shrubs will survive the attack, so control efforts are needed only for aesthetic reasons. (*David Shetlar, Ohio State University, and Phil Nixon*)

PLANT DISEASES

Crown Gall

Crown gall is a disease that invades a number of host species but is probably most common in Illinois on euonymus, grape, raspberry, and rose. The disease interferes with transport of water and nutrients, which makes infected plants stunted, weak, and more susceptible to winter injury.

This disease is caused by a bacterium called *Agrobacterium tumefaciens*. It appears as galls or overgrowths on the trunk, crown, or roots, and sometimes on the stems. The galls are initially white or tan, more or less round, and quite soft and spongy. As the gall ages, it develops an irregular, convoluted,

rough, corky surface and a hard woody interior; color becomes dark brown.

The causal bacterium can survive for many years in the soil on organic debris. It is easily spread in soil water or rain splash but can only penetrate plants through fresh wounds. Such wounds might be made during pruning, cultivating, transplanting, budding or grafting, or feeding by insects or other pests.

Control of crown gall is difficult. Begin by digging and destroying all severely infected plants, but be certain that crown gall is actually present. Early galls can be confused with callous tissue. Consult *Report on Plant Diseases* bulletin No. 1006 for details and photos of crown gall. In some cases, crown gall might be present but might seem to have little effect on plant growth. Such plants can remain at the site until growth declines.

Do not replace infected plants with a susceptible species. The bacterium is soilborne and will infect the new plants. Also, before purchasing new plants, inspect them closely for galls.

This disease has been a problem in the nursery industry because plants purchased without visible galls have been known to develop galls later. Federal inspectors have helped by ordering galled plants to be destroyed, and nursery growers are quick to comply. The ability of this organism to survive adverse conditions and multiply within the plant, however, makes this disease difficult to control. (*Nancy Pataky*)

Tomato Wilts

Questions about tomato wilt diseases have been common at the clinic during the past week. Wilts can be caused by several agents. Three common vascular wilts of tomato are caused by pathogens (infectious agents). Walnut wilt produces similar symptoms, including a brown discoloration of internal woody tissue, but it is caused by a toxin produced by walnut roots. Some viruses, flooding or rotting of roots, and even some herbicide injury can cause wilting of tomatoes.

The more common vascular wilts of tomato include several bacteria and two fungi, *Fusarium oxysporum* and *Verticillium dahliae*. The symptoms of *Fusarium* wilt and *Verticillium* wilt are similar. Infected plants might be somewhat stunted, and leaves turn yellow and die, often starting from the base of the plant and progressing upward. Leaves on one side of the plant might show symptoms, whereas leaves on the other side appear normal. Wilting might occur at or during the hottest part of the day or when the plants are

stressed from dryness or a heavy fruit load. Infected leaves might dry up before wilting is detected. Both diseases cause discoloration of the vascular (woody) tissue. With *Fusarium* wilt, the vascular tissue of stems and petioles becomes brown to reddish brown; whereas only the lower stem tissues take on a grayish color with *Verticillium* wilt. Laboratory isolation is required to distinguish these two pathogens positively. Both fungi are soilborne and infect plants through the root system; both are able to survive in soils in the absence of a susceptible tomato plant for many years. *Fusarium oxysporum* can also be seedborne.

Bacterial wilt is caused by *Pseudomonas solanacearum* and affects potatoes, eggplants, and peppers, as well as tomatoes. With bacterial wilt, the plant suddenly wilts without leaves yellowing. The center of stems is watersoaked at first, later turns brown, and might even become hollow. Check the roots of your plants if the stems are clean. These symptoms could be the result of a root rot from the excess water we had just a couple of weeks ago.

Disease resistance is the most common way to control the fungal diseases. Tomato varieties marked "VFN" have resistance to *Verticillium*, one or more races of *Fusarium*, and nematodes. Short-term crop rotations do little to control these diseases, but long-term crop rotation (of 5 to 7 years) can help reduce the incidence of *Verticillium* wilt. Removing infected plant parts, including roots, might reduce the buildup of inoculum. Using nitrate forms of nitrogen can help reduce the severity of *Fusarium* wilt, while ammonium forms promote disease development. Because low soil pH also favors *Fusarium*, increasing soil pH to a range of 6 to 7 can help control *Fusarium* wilt; do not raise it above 7.5, however, as this favors the development of *Verticillium* wilt. For more details, read *Report on Plant Diseases* bulletin No. 929, "Fusarium Wilt or Yellows of Tomato," and No. 1010, "Verticillium Wilt Diseases." (Nancy Pataky)

Bacterial Wilt of Vine Crops

This disease is most devastating on cucumbers and muskmelons or cantaloupes. The disease can also occur on pumpkins and squashes, though it is usually not as severe. Watermelons rarely, if ever, get the disease in the field. The bacterium that causes this wilt disease survives in and is spread by both the striped and spotted cucumber beetles.

Wilt symptoms appear first on individual leaves but quickly spread to lateral shoots, and, finally, the entire plant wilts. Symptoms develop more quickly on younger, smaller plants. The primary method for

controlling bacterial wilt aims at preventing infection by controlling the cucumber beetle vector. The application of both preplant systemic and postemergence protectant insecticides might be necessary to prevent a problem with bacterial wilt in commercial plantings.

Homeowners might use carbaryl or rotenone, as listed on page 175 of the 1996 *Illinois Urban Pest Management Handbook*, but it is too late to gain control now. At this time, identify the problem so that you will be ready to fight it next year. Pathologists do not have chemical recommendations to eradicate the wilt pathogen once the beetle has spread it to the vine crop. Extension entomologist Phil Nixon states that beetles overwinter as adults and are present when vine crops emerge. Because these insects are most attracted to plants in the cotyledon stage, insecticides should have been initiated immediately after planting.

To confirm the presence of the wilt bacterium, try this simple test:

1. Cut a wilted but live runner off the plant.
2. Make a cut in the runner near the base.
3. Hold the cut ends together, and squeeze them until the plant sap flows out and intermingles from each cut edge.
4. Slowly pull the cut ends apart.
5. If there is a strand of sticky sap between the cut ends, then a bacterium is likely present and bacterial wilt is a strong possibility.

Consult *Report on Plant Diseases* bulletin No. 905 for more about this disease. (Nancy Pataky)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

College of Agricultural, Consumer, and Environmental Sciences, University of Illinois at Urbana-Champaign • Illinois Natural History Survey • Urbana, IL 61801-2200

NEWSLETTER

JUL 19 1996

AG Librarian

No. 13 • July 17, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Systemic Herbicide Efficacy and Weather

The hot, dry weather of summer causes many plants to go into a summer dormancy with little growth. When this occurs, some postemergence, systemic herbicides such as 2,4-D, Roundup, dicamba, MCPA, and Vantage do not work as well. These products move through the plant from the point of foliage contact to and into the root system. Labels warn not to treat weeds under poor growing conditions such as drought stress since reduced weed control may result.

The products mentioned above kill the plant mainly by circulating with its sugars. Plants in summer dormancy produce and move fewer sugars around; and thus, the herbicide is often not effective.

When considering treatments, remember how a plant produces sugars and where they move to. When a plant is new, most of the sugar produced in the leaves is used in new vegetative growth; and therefore, the movement of sugar is mostly upward toward new leaf growth. As the plant matures, vegetative growth slows down or stops; and most of the sugar produced in the leaves begins to move toward underground storage in the roots. This is a key factor in controlling perennial weeds. At this point, the herbicide is often most effective for long-term control. The herbicide will translocate with the sugars into the storage roots.

If possible, consider fall treatments when trying to control difficult perennials such as ground ivy or Canada thistle. Fall is often an excellent time to apply herbicides that move with the sugars for effective movement to the roots. (Rhonda Ferree)

Nutsedge Update

As predicted in issue No. 6 of this newsletter, yellow nutsedge is prolific this year. Nutsedge can spread by seed, creeping rootstocks, or by small underground nutlets (tubers). The many hard brown nutlets (1/2 to 3/4 inch long) may lie dormant in the soil for several years before producing new plants. Since they prefer moist soils, the dormant nutlets have grown prolifically over the last couple of years.

Let's review the product labels of those herbicides labeled to control yellow nutsedge:

Basagran T/O is labeled for use in established turf, ornamentals, and roadsides. When using Basagran T/O to control yellow nutsedge, use two applications for best results. Apply 1-1/2 to 2 pints of Basagran T/O per acre combined with an oil concentrate when plants are 6 to 8 inches tall. If needed, make a second application at the same rate 7 to 10 days later. Be sure the nutsedge is actively growing, and do not cultivate or mow within 5 days before or after application of Basagran T/O.

Finale is a nonselective herbicide that will kill back the tops of nutsedge. However, since it is not systemic, the underground rootstocks and nutlets are not affected and will resprout.

Image is a selective herbicide for use in established warm-season turfgrasses and selected landscape ornamentals. Apply only as directed, as injury or growth suppression may be observed in desired plants.



MSMA is labeled for use in certain turfgrasses and noncrop areas. Apply with adequate coverage during warm weather when weeds are in an active stage of growth.

Pennant controls germinating nutsedge seeds in nurseries, turf, and landscape plantings. Apply Pennant before yellow nutsedge emerges or after existing plants have been removed. It has *no* effect on rootstocks or nutlets.

Reward is an aquatic and noncrop herbicide with contact activity. Similar to Finale, it will kill back the tops but leave the rootstocks and nutlets to resprout.

Roundup will kill existing nutsedge plants and immature nutlets attached to treated plants but has no effect on the nutlets that have not germinated. Repeat treatments are required for long-term control of ungerminated nutlets. Make applications when a majority of the plants are in the 3- to 5-leaf stage (less than 6 inches tall) and when plants are actively growing. (*Rhonda Ferree*)

INSECTS

Scouting Report

Japanese beetles continue to emerge and feed on a wide variety of trees, shrubs, and flowers. Concentrate control efforts on new transplants and important plants in the landscape because several insecticide applications or labor-consuming hand-picking will be required to reduce skeletonizing damage to leaves and blooms.

Potato leafhoppers continue to be numerous in various parts of the state. This insect has several generations per year and may disappear from some plants only to reappear at a later date. Weekly scouting may be needed to keep in touch with the situation.

Two-spotted spider mite activity should be watched for as long as the weather stays hot and dry. Cotoneaster, pyracantha, crabapple, rose, maple, and other woody ornamentals are commonly attacked. Damaged leaves will have small, whitish dots called stippling. This area dies and turns brown, resulting in a bronze appearance. Heavy damage results in dead leaves and leaf droppage. Fine silk webbing may also be present in the leaf axils. The mites are most common on the undersides of the leaves and are barely visible to the unaided eye. Scout for mites by striking the foliage over a piece of white paper and looking for the tiny, crawling mites. When crushed, they will leave red streaks on the paper.

Planthopper nymphs are brownish to whitish and less than 1/4 inch long. They are close relatives of leafhoppers and will walk around the stem or jump off when disturbed. They produce a white, waxy flocculent material that covers them and the stem and leaves on which they are feeding. Although planthoppers are sap-feeding insects, they are rarely numerous enough to cause damage. Their presence on hosta, rose, brambles, and other plants causes landscape owners concern. Due to the lack of damage, they rarely need to be controlled. Heavy sprays of water may wash them from the plant. Sprays of insecticidal soap or synthetic pyrethroids should provide control if needed. (*Phil Nixon and John Lloyd*)

Sod Webworm Moths

Adult sod webworms are appearing in our light trap at the Morton Arboretum in Lisle, Illinois.

The adult sod webworm moth is buff-colored with a wingspan of approximately 1 inch. At rest, the moth appears tubular, due to its habit of wrapping its wings around its body. The moth is easily disturbed and will fly jerkily for a few feet and then return to the turf. It is readily attracted to outdoor lights.

The damaging stage, the sod webworm larva, is about 1 inch long when mature, gray to dusky green, with a dark brown head and brown spots over its body. The larvae prefer to hide in a silk-lined tunnel in the thatch of the turf. The insect overwinters as a larva in a silken case near the thatch or soil surface and then resumes feeding in the spring. Following pupation, adult moths usually begin emerging in early to mid-June. Emergence occurs in early evening, with mating following shortly afterward. Egg hatch occurs in about a week, and the larvae require 4 to 6 weeks to complete their development. The life cycle lasts about 6 to 8 weeks; and in northern Illinois, there are generally two generations per year. In central and southern Illinois, two or three generations occur per year depending on the weather.

Larvae prefer to feed on bluegrass, orchardgrass, timothy, and other grasses, clipping the grass just above the sod. Brown spots will appear in the turf as the result of larval feeding. Generally, a good time to begin inspecting for larvae is approximately 2 weeks after a heavy moth flight. The feeding damage threshold for sod webworm larvae is two larvae per square foot of turf. If larval numbers exceed this level, there is the potential for damage to the turf.

In order to ascertain population levels, comprehensive sampling should be conducted throughout the

affected area. A soap solution drench may be applied to suspected areas. The drench acts as an irritant and will bring the larvae to the surface. Treatment decisions can then be made based on larval counts. Birds, particularly robins and starlings, like webworms; however, the birds generally arrive after extensive damage has occurred and the webworms are nearly mature.

Since an individual larva eats about 70 percent of its total food supply during the last 10 days of its development, severe damage can occur in just a few days. Therefore, early detection is essential for effective control. Healthy, well managed turf can support a considerable number of webworms as compared to turf that is in poor condition. Because the larvae do not eat the rhizomes or roots, otherwise healthy turf that has been damaged severely by sod webworms will usually recover following larval control and irrigation.

Control of sod webworm larvae can be achieved by applying foliar sprays of Sevin (carbaryl), diazinon, Dursban (chlorpyrifos), or Dylox/Proxol (trichlorfon). The nematode, *Steinernema carpocapsae* (Biosafe/Vector) may also be used. Liquid sprays (ECs, WPs, SPs) should be applied using at least 2.5 gallons per 1000ft² and granular formulations (Gs) should be applied with a fertilizer spreader and activated by watering. Remember that diazinon is not labeled for use on golf courses and sod farms! (Fredric Miller and Phil Nixon)

Annual White Grub

Annual white grub adults have emerged in southern and central Illinois. The first adult observed in central Illinois was on July 6, 4 days later than typical emergence. The flight appears to be normal to heavy in southern Illinois; but so far, the central Illinois flight appears smaller than normal. Adults should emerge soon in northern Illinois. These beetles lay eggs for up to 3 weeks, and the eggs take 2 to 3 weeks to hatch. It will be late July before most of the eggs are hatched in southern Illinois, early August in central Illinois, and at least mid-August in northern Illinois.

It is too early to tell whether there will be heavy grub damage this year. However, nonwatered turf at this time is brownish and the soil is dry. Annual white grub beetles prefer moist soil for egg-laying, burrowing into the soil after dusk to lay their eggs. If the adult beetle flight is normal or larger, we will likely have severe injury in irrigated turf areas. This damage

will probably occur in mid-August in southern Illinois, about the third week of August in central Illinois, and late August or early September in northern Illinois.

Insecticide applications should be delayed until the extent of the grub flight is known. In southern Illinois where the adults are numerous, imidicloprid (Merit, Grubex) can be applied at this time to irrigated turf. We will soon know in central and northern Illinois whether treatment will be needed. Application of other insecticides should be delayed until egg hatch has been completed. (Phil Nixon)

PLANT DISEASES

Black Knot of Plum and Cherry

This stem disease is serious but not very common because proper pruning and fungicide applications in commercial orchards are widespread. This year, however, we have seen several cases of advanced stages of the disease in both landscape and wild settings. *Dibotryon morbosum*, the causal fungus, can infect at least two dozen species of cherries, plums, and other members of the *Prunus* genus, including some ornamental species.

Black knot is fairly easy to diagnose. Elongated, rough, girdling black swellings develop on twigs, branches, and even the trunk. The knots are a velvety olive green in the spring. They gradually become hard, brittle, and coal black. If stems become girdled, dieback is evident. The trees gradually weaken and may die unless effective control measures are taken.

Purchase only disease-free nursery stock. Never buy trees with visible knots or abnormal swellings on the twigs and branches. Look for this disease in its early stages, which appear as light brown swellings that later rupture the bark and turn darker. Prune and burn (or bury) all infected wood in late winter or early spring before growth starts and as soon as new knots appear. Make cuts 4 to 8 inches behind any obvious, black-knot swellings. Knots on the trunk or on large limbs should be carefully cut out with a knife and chisel, removing about an inch of healthy bark and woody tissue beyond any visible gall tissue. If possible, destroy (burn) all available wild, neglected, or worthless plum and cherry trees.

Commercial fruit growers rely on timely fungicide applications, as well as pruning, to control black knot. Most infections occur between budbreak and 2 weeks after bloom, when wet conditions are accompanied by

temperatures of 55° to 77°F. Fungicide sprays should be applied as buds break and continued every 2 weeks until about 3 weeks after petals fall. These early season fungicide sprays do much to prevent new infections but are not effective in stopping infections already present. For this reason, all visible knots should be pruned from the trees.

For more information concerning control measures, resistant cultivars, and disease cycle, consult *Report on Plant Diseases* Bulletin No. 809, "Black Knot of Plums and Cherries." (Nancy Pataky)

Stewart's Wilt of Sweet Corn

Stewart's wilt is caused by a bacterial pathogen, *Erwinia stewartii*. It is vectored by flea beetles. When the beetles feed, they deposit the bacterium in the feeding wound. The bacterium then enters the plant where it can multiply and spread.

If flea beetle feeding is evident, Stewart's wilt symptoms can follow in 3 to 14 days. If insecticides are used to help control the disease, they should be applied before the beetles are seen, because the disease may already have been transmitted by then. To evaluate the risk of Stewart's wilt infection, growers need to know if the variety planted is a susceptible hybrid. Tables listing varietal reactions to Stewart's wilt are in the *Midwest Vegetable Variety Trial Report*, published at Purdue University as a multi-state publication. Check with your Extension educator for availability of this report.

Symptoms of Stewart's wilt appear as light green to yellow stripes along veins on the leaves. The stripes may be 1/4 to 1/2 inch wide, with wavy margins. With age, the stripes turn brown.

Varieties resistant to Stewart's wilt are available. Using these varieties is the easiest method of control. Growers wanting early season varieties will find less selection, but later varieties have much to offer.

Normal sugary hybrids with good resistance include Honey n Frost, More, Prime Pak, and Sweet Tennessee. Resistant, sugar-enhanced (SE) hybrids include Merlin, Miracle, Summer Flavor 79Y, Tuxedo, Ambrosia, Seneca Wardance, Argent, Coronation, and Silverado. Resistant super sweet (shrunkened or SH2) hybrids include Flagship, Florida Staysweet, Sch 5170, SsuperSweet 7210, SsuperSweet 7630, and Sweet Success. Hybrids that are susceptible to the disease include Jubilee, Sundance, Platinum Lady, Sugar Buns, Phenomenal, Supersweet Jubilee, and most hybrids that are early in maturity. This is by no means a complete listing. There are hundreds of sweet

corn hybrids from which to choose. It is fun just to read through the hybrid names and pick up on company themes. (Nancy Pataky)

Brown Patch of Turf

Brown patch commonly appears in hot, muggy weather when night temperatures are at least 70°F and daytime temperatures are in the 80s and 90s. It is favored by heavy rains or watering and by grass that is at least adequately fertilized and dense. The disease appears as patches, up to 2 or 3 feet across, where turf is light brown. It shows up best during wet weather, but the turf will not be matted as it is with *Pythium* infections.

Brown patch can be prevented by using cultural practices listed in *Report on Plant Diseases* bulletin No. 411. If the disease occurs, chemicals may keep it from spreading, but long-term control requires following cultural recommendations. Chemical controls are listed on page 15 of the *1996 Illinois Urban Pest Management Handbook*. Read the label carefully for recommended formulations, rates, and timing for your particular turf conditions. Because such applications usually require sprays at 5- to 14-day intervals throughout the summer, fungicide control of brown patch is usually reserved for golf courses. Also, products are not always available in quantities suitable for the homeowner's use. Some Ortho products, Fertilome products, and others are becoming more sensitive to homeowner needs and now offer packaging in quantities practical and affordable to homeowners. (Nancy R. Pataky)

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AG Librarian

No. 14 • July 24, 1996

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University of Illinois Horticulture Field Day August 21

The 1996 University of Illinois Turfgrass, Nursery, Landscape, and Trial Garden Field Day has been scheduled for August 21, 1996. This annual event is planned to provide up-to-date information and education to all professional turfgrass, nursery, landscape, and garden center personnel. This is an opportunity to visit the Landscape Horticulture Research Center and the Hartley Selections Garden.

Field Day registration will begin at 8 a.m.; current turfgrass, nursery, and landscape research will be displayed and explained during morning sessions. The afternoon program will feature workshops and classes. University horticulturists, educators, plant pathologists, entomologists, and agricultural engineers will be available to discuss research, answer questions, and diagnose plant problems. Bring samples of your plant problems for examination. In addition, afternoon workshops and educational sessions are planned to provide timely and interesting horticultural information.

Watch the mail for Field Day registration announcements. Make plans now to take advantage of this exceptional educational opportunity by visiting the Field Day. For Field Day questions or information, contact Tom Voigt, University of Illinois Extension turfgrass specialist, at (217)333-7847.

PLANT DISEASES

Tomato: Septoria Leaf Spot, Early Blight, Anthracnose

Septoria leaf spot and early blight are fungal leaf diseases that have been spreading on tomato leaves in the last weeks. Because these diseases defoliate the plants, the tomato fruit is exposed to sunscald, which contributes to the development of anthracnose on the fruit. Anthracnose is another fungal disease. All three fungi can be controlled using the same practices.

Septoria leaf spot will first appear as small, water-soaked spots on the lower leaves. These spots soon become circular to angular, with dark margins and grayish white centers often bearing one or more tiny black specks called pycnidia (spore structures). The individual lesions are about 1/8 inch in diameter but are easy to spot because the leaf quickly turns yellow and drops from the plant. Defoliation starts at the base of the plant and can be severe during prolonged periods of warm, wet weather.

Early blight will appear on tomatoes as they start to set fruit. High humidity levels and persistent dews are favorable for early blight. Cool temperatures may favor disease development. This fungal foliar disease is caused by *Alternaria* and is characterized by small brown leaf spots, with a concentric ring or targetlike effect within each lesion. Lower leaves show symptoms first.

This is a disease that can cause economic loss, but sprays are not usually initiated until the spotting occurs. Generally, sprays are started at first bloom; however, some of the newer tomato varieties may be more susceptible to this fungal blight, and sprays may be needed earlier on those varieties. Therefore, it is important to scout for this disease on a regular basis, especially in wet weather. Dry weather is not favorable for development of early blight.

Anthrachnose ripe rot will cause lesions of about 1/2 inch in diameter on the ripened fruit of the tomato. Concentric rings may appear within these lesions. Although fruit lesions are the most common anthrachnose symptom, this disease may appear on other plant parts as well.

Commercial growers often need to rely on chemical control of these diseases. Chemical control may be obtained with Bravo, or one of the formulations of mancozeb, such as Dithane, Manzate 200, or Penncozeb, applied at 7- to 14-day intervals. In areas of high rainfall, growers will need to stay with the shortened spray intervals. Home growers should concentrate on keeping all ripe fruit picked off plants, improving air circulation in the garden, and removing tomato vines and unharvestable fruit at the end of the season. More information is in *Report on Plant Diseases* bulletin No. 908. (Nancy Pataky)

Dogwood Anthrachnose Note

Dogwood anthrachnose was discussed in issue No. 8 of this newsletter. It was pointed out that although neighboring states to the east, south, and west have reported the disease, it had not yet been confirmed in Illinois. That has changed recently. Dogwood anthrachnose, caused by the *Discula* fungus, has been confirmed in Illinois through the Plant Clinic. It was found in a forested area in Wabash County.

This note is not meant to alarm anyone. We suspected the disease was present in Illinois and expected to find it in just this sort of location. I do not believe the threat to dogwoods is any more intense now than it was prior to this finding. Review the symptoms discussed in issue No. 8, and send a sample to a plant clinic if you think dogwood anthrachnose might be present. The disease is treatable. Meanwhile, keep trees well watered in drought, avoid overhead irrigation, prune and discard dead wood, rake up fallen leaves, avoid high nitrogen fertilization, and use a mulch over the root system where possible. (Nancy Pataky)

Dutch Elm Disease and Elm Yellows

These two elm diseases play a large role in the decline of elms in Illinois. While Dutch elm disease (DED) is easy to confirm at the Plant Clinic, confirmation of elm yellows is not possible at our facility. We must rely on symptoms to diagnose elm yellows.

DED causes yellowing of the leaves, followed by wilting and browning. Usually a single branch is affected; then symptoms spread to adjacent branches,

and finally the entire tree wilts and dies. Symptoms may progress through these stages in one season in susceptible trees or over several years for more resistant trees. The most important symptom to look for is discoloration of the vascular tissue. Peel back the bark of an infected branch. The DED fungus causes the development of brown streaks in the outer sapwood. Since other wilt diseases of elms (such as *Verticillium* wilt and *Dothiorella* wilt) also cause this discoloration, positive identification requires laboratory culturing of the fungus. Cut several 6- to 8-inch long sections from wilting, but living, branches that show definite streaking in the sapwood. The fresh wood sections should be 1/2 to 1 inch in diameter. Send them in plastic to the Plant Clinic for culturing. Chips are taken from the wood and incubated in lab media until the fungus grows out of the wood and can be identified. This process takes about 7 days.

American elms are very susceptible to DED. Although Chinese and Siberian elms are more resistant, infection of these species can occur. More resistant elms have been developed, including Sapporo Autumn Gold, American Liberty, and Urban elms.

If you see the decline symptoms described above but fail to find the vascular discoloration, the problem could be elm yellows, also known as phloem necrosis. The disease might occur in any part of Illinois but has been more common in the southern two-thirds of the state.

Elm yellows is primarily a problem of American elm. Other susceptible elms include winged elm, cedar elm, red or slippery elm, September elm, and hybrids of red and Siberian elm.

Symptoms of elm yellows include a rapid, general decline in midsummer. Leaves droop, curl upward at the margins, turn yellowish green then bright yellow, and finally turn brown and drop off within a few weeks. Branches then die, followed by the entire tree within one growing season. If symptoms do not start until late summer, the tree may leaf out normally the next season and repeat the decline in early June. It is important to know the symptom development over time when trying to diagnose this disease. The innermost bark of infected trees turns yellow, then butter-scotch or tan, sometimes flecked with dark brown before finally turning totally dark brown. When several pieces of the inner bark are chiseled from dying trees and placed in a small, clear jar for 5 minutes, they have a faint odor of oil of wintergreen. I have never smelled this on lab samples and would encourage you to try this at the site on your own.

Elm yellows is caused by a mycoplasma-like organism (MLO). Unlike the fungus causing DED, the MLOs cannot be cultured in a lab. For this reason the Plant Clinic is not very helpful in diagnosing this disease, other than to possibly rule out DED. You can obtain information on symptoms in Report on Plant Diseases bulletin No. 660. DED information is available in Report on Plant Diseases bulletin No. 647.

Resistance is available to elm yellows. Smoothleaf elm, Scotch elm, Chinese elm, and Siberian elm are reported as resistant to the MLO. (*Nancy Pataky*)

HORTICULTURE

Poison Ivy

As it did last year, poison ivy has been popping up in ornamental shrub and perennial plantings, probably seeded through bird droppings. When growing among desirable plants, poison ivy is a challenge to control.

A member of the sumac family, poison ivy (*Rhus radicans*) has leaflets in threes. Leaflets are entire, or they have a few coarse teeth. Although sometimes bushy and erect, poison ivy typically creeps in and around plants and up trees or structures. It has very small green flowers in the late spring and early summer which develop into gray or whitish berry-like fruit. Another member of the sumac family, Virginia Creeper (*Parthenocissus quinquefolia*), is often confused with poison ivy; however, Virginia creeper has leaflets of five, not three.

Several products are available to control poison ivy, but none offers selective control in landscape areas. In noncrop areas, such as parking lots, industrial areas, and gravel areas without plants, many options are available. Consult the *1996 Urban Pest Management Handbook* for listings of products labeled to control poison ivy as foliar, basal-bark, and cut-surface treatments.

To control poison ivy in a landscape setting, three methods may prove successful:

- Grubbing or hand pulling the vine when the soil is wet;
- Severing the main vine and pulling it out of the existing vegetation, then treating new shoots that emerge with a herbicide to kill the roots; and
- Treating the foliage with a herbicide, which may mean painting individual leaflets to avoid contacting landscape plant foliage.

Potassium salts of fatty acids (e.g., SharpShooter) work well on small seedling poison ivy, but older plants will only be suppressed with top kill, leaving roots to regenerate. Glyphosate (e.g., Roundup) is most effective when applied 2 weeks on either side of full bloom in early summer. Repeat applications of Roundup may be required to maintain control, and fall treatments must be applied before leaves lose green color. Ortho makes a couple of homeowner formulations, including triclopyr (e.g., Ortho Brush-B-Gon Poison Ivy Killer) and glyphosate (e.g., Kleeraway Grass and Weed Killer).

Should you contact the plant in efforts to clean up an infestation, washing immediately (within 1 to 3 minutes) with cold water and soap, may prevent development of symptoms. Poisoning depends on direct contact with the plant's oil, which can be picked up from bruised foliage, or from contaminated shoes, clothing, pets, and other objects. All parts of the plant are poisonous and can cause rash development. Poison ivy does not spread from blister fluid as some believe. (*Rhonda Ferree*)

INSECTS

Scouting Report

Japanese beetles are out and feeding on deciduous plant materials throughout Illinois. They have just been picked up for the first time in Jasper County, which is close to known infested areas. While in the Chicago area the weekend of July 13 for the Plant Health Care Workshop, we were bombarded by beetles flying around the Thornhill Center at the Morton Arboretum. A comment from the crowd insinuated that even entomologists with Ph.D.'s could scout for insects when they hit them in the chest.

Annual white grub adults are in full emergence throughout the state. We have had reports of high numbers in the Jacksonville and Urbana areas. Unless you are using imidicloprid (Merit, Grubex), treatment should be delayed until late July in southern Illinois and early August in central and northern Illinois. Imidicloprid treatments should be applied now, if needed.

Black cutworm has several generations per year, and large numbers of moths have been reported in Ohio. With unwatered turf dormant and probably less attractive to egg-laying moths, golf course superintendents should be watchful of infestations on greens.

Lacebugs are present on a variety of hosts throughout the state. In the Springfield area, large numbers have been reported on birch, beech, oak, poplar, buckeye, and sycamore. Damage in Illinois is usually limited to a large light-colored area in the center of the leaf upperside, with numerous bugs present on the underside. Severe infestations will give the entire ornamental a sickly grayish green appearance. Acephate (Orthene) or cyfluthrin (Tempo) should be effective. Insecticidal soap will also provide control.

Locust leafminer causes small, glove-shaped mines in black locust leaves and has at least two generations per year. Damage can be severe, particularly in southern and northwestern Illinois. Treatment with carbaryl (Sevin) is effective now when the 3/8 inch adult orange and black flattened beetles are present.

Mimosa webworm first generation is present throughout the state. First generation damage will appear on honey locust and silk tree or mimosa as three or four leaflets webbed together and skeletonized. The second generation moths tend to lay their eggs into the first generation damage and damage three or four compound leaves. If damaged areas are numerous throughout the tree, controlling the first generation or early second generation caterpillars will avoid extensive damage later. (*Phil Nixon, John Lloyd, Dave Shetlar, and David Robson*)

Annual White Grub Homeowner Control Options

Professionals have had a variety of effective insecticides to control white grubs for several years. Recently, some of these insecticides have become available to the general public and are being sold in garden centers and other retail outlets.

Diazinon has been the homeowner standby for white grub control for many years. Although the material is long-lasting and effective, it has a couple of drawbacks. Diazinon commonly takes 3 weeks to kill treated grubs, although little feeding occurs during that time. However, the presence of live grubs after treatment upsets many homeowners. The full label rate of diazinon needs to be applied to get good grub control. For this reason, proper calculation of the amount of insecticide needed and equipment calibration are important for success.

Trichlorfon (Dylox) has also been available for a number of years. It is a very effective insecticide against grubs but is short-lived. Grubs need to be present when this insecticide is applied; however, it kills grubs quickly. This makes it especially useful for

rescue situations where damage is occurring, and one needs to know within a few days whether control has been achieved.

Imidacloprid (Merit, Grubex) is new to the homeowner market this year. It is very long-lasting and can be applied in the spring to get grub control in August. It takes 3 weeks to kill grubs in many situations. It should be applied in July once it is determined that numbers of adults are high enough and that soil moisture is low enough to get heavy egg laying in irrigated turf.

Bendiocarb (Turcam, Intercept) is also new to the homeowner market this year. It is long-lasting and effective, with control lasting at least a month. It also provides control soon after application.

Isofenphos (Oftanol), carbaryl (Sevin), and chlorpyrifos (Dursban) are also labeled for homeowner white grub control. Isofenphos can be very short-lived in some soils, commonly breaking down in 2 weeks and in less than a week in some situations. Control provided by carbaryl and chlorpyrifos tends to be inconsistent, providing control in some situations and not others. Many homeowners use these insecticides and experience excellent control.

With all homeowner-applied products, it is recommended that granular formulations be applied and then irrigated in through the thatch to the root zone with at least 1/2 inch of water. Those with in-ground irrigation systems can use liquids as well as granulars as long as the insecticide is not allowed to dry on the grass blades before irrigation occurs. (*Phil Nixon*)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

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This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Blossom-End Rot of Tomato

As is usual this time of year, blossom-end rot questions have been prevalent lately and have prompted many phone calls. As the name suggests, blossom-end rot develops at or near the bottom (or blossom end) of the fruit and appears as a slight, water-soaked area. On tomatoes, the area enlarges, darkens, and becomes dry, sunken, flat, leathery, and dark brown to black. Various molds and fruit rots may develop within the sunken area. Pepper, summer squash, and other cucurbit crops may also experience this problem.

Blossom-end rot is actually a noninfectious disease that is thought to be caused by insufficient calcium when the fruit is forming. Calcium deficiency usually results when nitrogen levels are high, when plants grow rapidly, and when extremes in moisture occur (heavy rains, drought, root injury, etc.). When soil moisture is limited, plant growth slows, and nutrient uptake by the roots is reduced. If water becomes available again, the plant begins to grow rapidly but the uptake of calcium lags behind. Thus, the rapidly expanding fruit tip does not have enough calcium available to develop properly, even though there is plenty of calcium in the soil.

Tomato varieties differ greatly in their susceptibility to this noninfectious problem. Since the problem is noninfectious, the condition will not move from

affected to healthy fruit. Although there is nothing you can do to help the affected fruit, good horticultural practices can help manage the problem. These practices should include maintaining even and adequate levels of soil moisture to ensure that the nutrients stay in balance.

Foliar applications of a calcium-rich fertilizer to control blossom-end rot have mixed reviews. Some studies indicate that some control is achieved, while others report little or no reduction in the disease.

For more information on blossom-end rot and some varieties with lower incidence, consult *Report on Plant Diseases* bulletin No. 906. (Nancy Pataky, Jim Schmidt, and Rhonda Ferree)

INSECTS

Scouting Report

Pine shoot beetle has been confirmed by APHIS (USDA Animal Plant Health and Inspection Service) officials from trap catches in Stephenson and McLean counties, for a total of five new county records for 1996 (Piatt, Boone and Lee were reported previously). Illinois now has 20 counties considered infested and quarantined for this insect.

Potato leafhopper damage continues to occur on red maple, amur maple, red bud, burning bush, and other trees and shrubs throughout Illinois. Adults are present in large numbers in central Illinois at this time. Attacked plants important to the landscape need to continue to be protected with pyrethroid insecticide applications. Applications usually need to be applied every 2 weeks.

Yellow-necked caterpillars are present in central Illinois as half-grown red larvae. Older larvae are black with a yellow to orange area behind the head. Both red and black larvae have several white lines running down the body. These caterpillars have at



least two generations throughout the state. They are most common on oak, crabapple, walnut, pecan, and hickory. They are colonial feeders, stripping large branches of their leaves. Damage at this time of year may cause the trees to releaf, reducing available energy for growth. Damage by leaf-feeding caterpillars after mid-August is usually not important to the tree because leaves eaten after that time will normally not be replaced by the tree. Food production from those older leaves is also limited.

Annual white grub adults continue to fly throughout the state. In 1 or 2 weeks, we should be able to get some idea of the larval numbers present in turf. We will be providing that information when it is available.

Green June beetle adults are present in central and southern Illinois. The inch long metallic green beetles with yellow edging on the wing covers occur in Illinois as far north as Interstate 80. The large beetles are noisy fliers that are more active during sunny times of the day. They pay little attention to where they are flying and commonly fly into cars, people, and buildings. Green June beetle adults will feed on peaches and other soft fruit but usually cause little noticeable damage to anything else. They lay their eggs into dead grass and straw, with the larvae most numerous in thatchy turf, piles of grass clippings, and manure piles. Control of the adults is difficult and usually not needed.

Japanese beetles are causing leaf damage to grape, brambles, crabapple, peach, linden, birch, oak, willow, rose, and other trees and shrubs throughout the infested areas of Illinois. They are laying eggs in irrigated turf, and the resulting white grubs can be scouted for in early to mid-August. (*Phil Nixon and John Lloyd*)

Japanese Beetles: An Ancient Nemesis?

When we talk about Japanese beetles, at times it may sound like we are talking about a new pest in Illinois. That just isn't the case. In recent years we've observed beetles expanding into new areas of the state, but the beetles have been around for a long time. Official APHIS Cooperative Economic Insect Reports record 1934 as the first year that Japanese beetles were identified in Cook County, Illinois. The Illinois Natural History Survey Insect Collection has Japanese beetle specimens that were collected from Cook County in 1929. In the 1960s, the beetles began expanding their range, and potential control became more feasible with insecticides. Through the 1960s and 1970s, major control efforts were instigated to

control Japanese beetle spread across the United States.

In recent years, we observed a rebound and an expansion of Japanese beetle populations across Illinois. APHIS currently considers Illinois to be "generally infested." This categorization means that for purposes of shipment of nursery stock and soil to places that have import restrictions on Japanese beetles, such as Canada, materials from Illinois are considered to be potentially infested.

Japanese beetles have been documented as occurring in 37 Illinois counties. They are Bond, Carroll, Champaign, Clark, Clay, Coles, Cook, Douglas, DuPage, Edgar, Effingham, Fayette, Grundy, Iroquois, Jackson, Jasper, Kankakee, Lake, LaSalle, Lawrence, Livingston, McLean, Macon, Madison, Marion, Monroe, Montgomery, Ogle, Peoria, Randolph, Rock Island, St. Clair, Tazewell, Vermilion, Wayne, Whiteside, Will, and Winnebago. In our efforts to document the extent of Japanese beetle infestation in Illinois, we are asking that people collect the beetles if they find them in counties not listed above. Please send the specimens to Charles Helm, Survey entomologist, 172 Natural Resources Bldg., 607 E. Peabody Dr., Champaign, IL 61820. Include information on the date of collection, the county where collected, the town or nearest town to where collection was made, and who collected them. Enclose the specimens in a pill bottle or other crush-resistant container. (*Charles Helm and John Lloyd*)

Cicada Killer

Cicada killers are large wasps, about 1-1/2 inches long, that are becoming very common in landscapes throughout Illinois. These wasps are black with yellow markings and have reddish, transparent wings. They nest in the soil, causing 1/2-inch diameter burrows with loose soil piled around the opening.

Male cicada killers establish flight territories and are constantly patrolling them during sunny hours. Anything, including humans, that enters the territory is immediately inspected. The presence of a large wasp hovering in front of a person and zipping around on all sides is disturbing. Combine that with the image of a person walking across a lawn and entering several male cicada killer territories, with each wasp checking out the intruder, and one understands that it can be unnerving.

Female wasps attack, sting, and paralyze cicadas, katydids, and other large insects and transport them to their underground burrows through flying and drag-

ging. In the burrow, an egg is laid on each victim and the resulting larva eats the paralyzed prey.

The sting of wasps, bees, and ants is a modified egg-laying structure. Thus, the intimidating male cicada killers cannot sting. Female cicada killers can sting but rarely do. They will put up with people near them and even their nest openings being filled in without attacking. The only instances of stings that I am aware of are due to either grabbing hold of the cicada killer with a bare hand or stepping on one barefoot.

Even though protection from stings is rarely needed, control may be needed for other reasons, such as getting mail delivered. Application of diazinon to the burrow area will usually eliminate the wasps.

(Phil Nixon)

PLANT DISEASES

Root Rots of Annuals and Perennials

Root rots have become a problem to flower gardens again this year. The great diversity of moisture conditions in Illinois means that a diversity of fungal species might be involved.

All garden flowers may be affected by one or more root rots, and symptoms vary. Plants may be stunted or low in vigor, may grow slowly, or may wilt easily on a warm day. Foliage may turn yellow to brown and drop prematurely, usually starting with older leaves and moving up the plant. The severity of the root rot depends on the fungal pathogen, the susceptibility of the plant, and the soil conditions.

If a root rot is suspected, the plant should be carefully removed and its roots washed and examined for indications of rotting. A healthy plant has numerous white roots that appear fibrous. Roots of a diseased plant show various degrees of water-soaking and usually are some shade of brown or black.

Aboveground symptoms similar to those of root rot may be caused by environmental factors such as a lack of or excess water, poor drainage, too deep planting, accumulated salts in the soil, insufficient light or nitrogen, potbound roots, and a sudden change in the environment (e.g., a cold draft or a change in temperature, lighting, or humidity). In garden flowers, environmental conditions that most often cause symptoms similar to those of root rot are an excess or lack of water, or insufficient nitrogen. In the northern parts of the state, excessive water, along with inadequate drainage, may be the main problem.

Of course, growers can create the same conditions by overwatering. Root rot pathogens often follow.

There are many root rot pathogens, but the major fungi that will be encountered in flowers are *Rhizoctonia*, *Fusarium*, *Pythium*, and *Phytophthora*. In a very simplified view, we can group the first two fungi as those causing a dry rot and often a reddish pink cast to roots. *Pythium* and *Phytophthora* can be grouped as the types causing a soft, brown-to-black rot of roots.

Control of root rots should be aimed at prevention: use of resistant varieties when root rots are known to be a problem, use of healthy transplants, proper site preparation to provide good water drainage away from roots, use of balanced fertilizer, and rotation in the garden plantings for 2 or 3 years with unrelated annual flowers to help prevent the buildup of pathogens in one area. Remove crop residue at the end of the season to help reduce pathogen survival.

Despite good preventive practices, root rot diseases may still occur. Fungicides are available to the major group of fungi mentioned but are not registered on all ornamentals. Specific hosts and chemicals registered for disease control are listed in the *1996 Illinois Urban Pest Management Handbook*. Details about the root rots are given in *Report on Plant Disease* bulletin No. 615. (Nancy Pataky)

Sclerotinia White Mold

White mold is a disease caused by the *Sclerotinia* fungus. This fungus will remain in the soil as resting spores (sclerotia) for many years. These spores look somewhat like black seeds or rabbit pellets, and the centers are gray. Germination occurs at relatively cool temperatures, and sporulation requires a period of wet weather. Recent rains and cool temperatures in parts of the state have been ideal for this fungus and, consequently, the white mold disease.

To identify this disease, look for bleached areas on the stems and at leaf axils. They appear almost like animal bones dried in the sun. In cool, wet weather, a fluffy mold develops on the stem. In 7 to 10 days, sclerotia form inside the stem or on the outer surface. Surface sclerotia easily fall to the ground where they can be moved with equipment, plant material, animals, and water. *Sclerotinia* white mold is common on tomato, green bean, pepper, and soybean as well as on ornamental crops such as begonia, daisy, delphinium, hydrangea, marigold, pansy, and zinnia.

Control options are limited. The home grower can try to keep plant density low so that air movement

will help plants dry quickly. There are no rescue treatments for commercial growers. Fungicide applications may help on a preventive basis in areas where this is a problem every year, but we are past the window of opportunity for application of fungicides for use this year. Chemical options are provided in the *1996 Illinois Agricultural Pest Management Handbook* for commercial vegetable producers. Chemicals are more limited for homeowners, but some are listed in the *1996 Illinois Urban Pest Management Handbook*. When white mold is a problem, rotation out of the infected area is generally recommended for at least 3 to 5 years. Details concerning this disease and the pathogen can be found in *Report on Plant Diseases* bulletin No. 1008. (Nancy Pataky)

Goutweed, Bishop's Weed Note

There is a widespread, perennial ground cover that is called goutweed, or sometimes bishop's weed, ashweed, ground ash, ground elder, or herb gerard. The scientific name is *Aegopodium*. It has a compound leaf, gets to be about 14 inches tall, spreads quickly, and is most common in its green and white variegated form.

The Plant Clinic has fielded many calls about this plant in recent weeks. The complaint is that the foliage is brown; leaf edges are burnt; and the normally lush plant is thinned and looks weak. We have worked with a few of these plants over the years and have never recovered a pathogen from the foliage or roots. An infectious disease is not to blame.

The problem is sunburn or scorch. The variegated type of goutweed is easily burnt in sunny locations. This sort of injury is most likely to occur in hot, sunny weather following a period of lush growth. Maintenance of this plant includes periodic mowing throughout the growing season whenever the foliage looks bad. Mowing will encourage new growth and will help keep plants dense. Do not mow so low as to damage the crowns. (Nancy Pataky)

Rhododendron Root Rot

Wet weather has set the scene for *Phytophthora* to invade the roots of rhododendron, especially those planted in heavy or poorly drained soils. It has been said many times that the two limiting factors to growing rhododendrons in Illinois are clay soils and this fungus. The causal fungus is a water mold and will only infect the root system in periods of wet weather when the soil has been flooded or saturated for an extended period of time. In some cases, this may mean only 12 hours of saturated soils. Plants that

were under stress in the past will be more susceptible to infection.

Look for chlorosis of leaves and a downward roll of the leaves parallel to the midrib. The leaves eventually wilt but remain on the stem for weeks after plant death. The roots will have a soft, brown to black rot. The most susceptible rhododendrons may die in as little as 2 weeks. There is some resistance available to this disease, but most rhododendron cultivars are susceptible.

Established rhododendrons with *Phytophthora* root rot can be treated with a fungicide as a drench around plants to saturate the soil. The applications need to be repeated at 3- to 12-week intervals in the spring and fall. With some fungicides, granules can be blended into the soil before planting. Registered fungicides include, but are not limited to, Aliette, Banrot, Terrazole, Truban, Banol, and Subdue. Read the labels carefully for rates, restrictions, etc. Homeowners may not be able to find these fungicides in small packaging, but they are available to commercial concerns in larger quantities. Also, whenever possible, Subdue should be alternated with another fungicide or mixed with it to avoid development of resistant strains or races of the fungus.

If you are planting rhododendrons in the fall or next season, it is imperative that you choose a well-drained, protected location. This is an ericaceous plant, which means it requires an acidic soil. If possible, try to use a somewhat resistant cultivar. Consult information available in *Dwarf Shrubs for the Midwest* by Rebecca Keith and Floyd Giles (University of Illinois Special Publication 60) or other sources.

More information on this disease can be obtained in *Report on Plant Diseases* No. 664. (Nancy Pataky)

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HOME, YARD & GARDEN PEST

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NEWSLETTER

No. 16 • August 7, 1996

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Biweekly Issues Start

This is the last weekly issue of the *Home, Yard, and Garden Pest Newsletter* for 1996. We will shift to publishing issues every two weeks through September so that late season pest problems can be addressed. We will then have two more winter issues after September.

INSECTS AND OTHER PESTS

Scouting Report

Bagworm numbers are high in southern and central Illinois. Their large size, about 3/4 inch long, cause most insecticides to be ineffective. Control can still be achieved with cyfluthrin (Tempo) and other synthetic pyrethroids.

Mimosa webworms have finished their first generation. Watch for the presence of small larvae in damage caused by the first generation. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) and other chemical insecticides should be effective when larvae are present.

Planthoppers are common on hosta and other perennials in southern Illinois. Their presence can be noted by the whitish, stringy, powdery material produced by the nymphs. Control is rarely needed, although most contact insecticides will be effective.

Potato leafhoppers continue to be numerous throughout the state. Heavy damage is being experienced by red maple, amur maple, red bud, crabapple, and euonymus. Initial treatment this late in the season may not be justified due to the damage already caused. Synthetic pyrethroids such as cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), permethrin (Astro), and bifenthrin (Talstar) should be effective.

Hickory leafstem gall is numerous in southern Illinois. This 1/2 inch diameter gall on the petiole of hickories turns from green to brown as the summer progresses. The gall is caused by phylloxera, close relatives of aphids. Damage is usually slight, and control is not usually needed or practical.

Green June beetle adults continue to fly in central and southern Illinois. They are busy laying their eggs into grass clipping piles, mulch, and turf. The resulting larvae are not usually damaging. There is little to no control practical for the adults.

Japanese beetles continue to feed on trees, shrubs, and flowers in various areas of Illinois. It is interesting to see the heavy damage that they cause to various weeds as well as desired plants. They should become less numerous in the next 1 to 2 weeks and then disappear. Their white grub larvae should finish hatching in various turf areas over the next few weeks.

Annual white grub adults had an extended flight this year; they were present in central Illinois into the last week of July, probably reflecting an extended adult emergence. For this reason, there may be some late hatching eggs, and full white grub potential in turf may not be predictable until that time. Because most eggs are still hatching, we will delay a report on larval numbers until the next newsletter. (*Phil Nixon, John Lloyd, and Tom Royer*)



Twig Pruners and Twig Girdlers

Flagging branches on oak, hickory, persimmon, linden, maple, and many other deciduous trees may indicate the presence of twig pruners or girdlers. Damage of this type is usually blamed on squirrels, but in some cases insects are actually the culprits.

Adult twig pruners are actually a species of longhorned beetles, beetles with long antennae. Adult twig pruner females bite notches in young twigs at leaf axils into which they lay eggs in the early summer. Larvae hatch from the eggs and tunnel inside the living twigs. In early autumn the larvae move from feeding in the interior of the twig to the area directly underneath the bark where they girdle the twig. The larvae then pack the girdled end of the twig with feces and prepare to pupate and overwinter. The girdled twigs remain attached to the tree by the bark until a disturbance, like a gust of wind, knocks them off the tree. When the broken twigs on the ground are examined, the severed end of the twigs are always clean cut with ragged bark.

Another insect can also be the culprit in causing twig drop in oaks and other deciduous trees. This insect is known as a twig girdler and is another longhorned beetle. Adult twig girdlers are active in August and September. Female beetles lay eggs in twigs and then chew a continuous notch around the twigs. The female girdles the twig to form an environment, without sap flow, where the larvae can survive. Females will lay between 3 and 8 eggs per twig. Girdled twigs die and break off in the summer through fall. Unlike the clean cut of the twig pruner, twigs broken off by twig girdlers have ragged edges. After the twigs fall, the eggs hatch and the larvae remain dormant inside the twigs until spring. In the spring the larvae feed on the wood inside the twig. Pupation occurs in late summer, and adults emerge in August and September. They usually have a year life cycle, but larvae have been known to take 2 years to develop.

Besides making a mess underneath infested trees and causing what appears to be flagging of the twigs, pruners and girdlers can deform trees in the landscape and nursery by clipping off terminal leaders. Cultural control through the removal and destruction of broken twigs and branches will help to prevent adult emergence and reduce future problems with these insects. (*John Lloyd*)

Squirrels

Although large numbers of twigs scattered under trees, particularly oaks, are frequently caused by twig pruners or girdlers, squirrels can also cause this type of damage. These twigs are usually the 6 to 8 inch long branch tip and contain several leaves. The damaged end of the twig will show a sharp cut, similar to that made by hand pruners. The front teeth of a squirrel allows the rodent to make this sharp, even cut. This damage is frequently caused by a single squirrel and does not appear to be related to feeding or other needs of the squirrel, except perhaps a need to be onery. This twig nipping usually occurs for only a short time and can usually be ignored except for raking up dropped twigs. Although the number of twigs on the ground may appear large, they comprise only a very small percent of the twigs on the tree, making tree injury slight.

Squirrels will also strip bark off trees. Portions of branches up to several feet long can have all of the bark pulled off them. Occasionally, small- to medium-sized trees can be completely stripped of bark, except for the smaller twigs. Branches or trees that experience this girdling are unlikely to survive. Identify the culprit by looking for tooth marks on the wood and for 1/2 inch wide crescent-shaped cuts through the bark where the damage begins. These crescent-shaped cuts correspond to the shape of a squirrel's front teeth. Maples and other trees whose bark slips easily may not have any tooth marks on the wood but will have these crescent-shaped cuts. This type of damage is more likely to occur in early spring and late summer when young are being reared and finding sufficient food becomes a problem.

In late winter and early spring, tree buds become a favorite food for squirrels. Heavy feeding can result in bushier branch tips from accessory bud growth. Squirrels also build large nests consisting of twigs and leaves in branch crotches. These become obvious at leaf fall. Squirrels also live in tree cavities where their young are more likely to survive.

Control of damage can be accomplished in several ways. Realize that in many landscape situations, residents will not tolerate anything that harms the squirrels. This usually eliminates shooting, although that may be an option in some situations.

Individuals may also be removed by live-trapping. Live traps placed at the base of trees and other

frequented areas are effective. Traps can be baited with apple or orange slices, nutmeats, oatmeal, or sunflower seeds. Animals captured should be humanely killed, although release at least 5 miles away from the problem area is a possibility. Studies have shown that released mammals frequently die a slow death of exposure and starvation, making relocation a relatively inhumane way of treating them.

Frequently, squirrel damage, particularly twig cutting, is caused by only one squirrel. Removing that individual may be the most effective damage control method. Elimination of all squirrels in an area is not practical because squirrels from surrounding areas will continually colonize the area. Before shooting, trapping, or otherwise removing the animals, contact state conservation officials in the Illinois Department of Natural Resources for the proper licenses or permits.

Squirrels can be kept out of individual trees by encircling the trees with a 2-foot wide collar of metal located 6 feet off the ground. The metal can be attached using encircling wires held together with springs to allow for tree growth. For this method to be effective, the tree cannot be within 6 to 8 feet of nearby trees, roofs, or other objects from which squirrels can jump.

The taste repellents, Ro-pel, thiram, and capsaicin, can be applied to trees and shrubs and will provide some protection. However, the effectiveness of repellents depends on how easily alternative sources of food or nesting materials can be found. If squirrel numbers are high, repellents will be less effective. (Phil Nixon and Robert Corrigan)

PLANT DISEASES

Verticillium Wilt of Magnolia

The presence of *Verticillium* on magnolia is nothing new. It is not a common occurrence, however. The clinic has confirmed *Verticillium* wilt in this species a few times over the last several years. If you have a magnolia tree that was injured by the environmental stress of the last 2 years, it may be more susceptible to this disease. What may have begun as winter injury and slow recovery this past spring may now be an infectious disease. Look for vascular discoloration in the center of the stem or in the new rings of growth. You may see this by peeling back some of the bark, or you may have to look at a stem cross-section.

If *Verticillium* wilt is present, your only options are to improve tree vitality or remove the tree. Prune out

dead wood; water in periods of drought; fertilize this fall in late September. If the tree is removed, keep in mind that the fungus is soil-borne. Select a replacement species that is not host to this fungus. Consult *Report on Plant Diseases* bulletin No. 1010. (Nancy Pataky)

Sphaeropsis Blight of Pine

This disease is also known as Diplodia blight or tipblight. Because the fungal pathogen has been associated with cankers and sap exudate on the stems, as well as the typical tipblight symptoms, we prefer to call it *Sphaeropsis* blight.

The most common symptoms are easy to spot. The fungus invades the new needles, causing stunting, browning, and twisting of the new shoots and needles. In a wet spring such as 1995 and 1996, branches over an entire tree may show brown tips. Because the young candles die, new buds are initiated below the branch tips. These may also become infected if wet conditions prevail. We do not see infection of year-old needles. Because the injury usually affects new growth, the tree becomes disfigured and is easily spotted.

Once the infected tissue dies, the fungus produces fruiting structures called pycnidia. These appear as pinhead-sized black specks at the base of infected needles and on infected cone scales. Gently pull out a few of the tip needles, and look at the base of the needles for these pycnidia. They are easy to see on the needles but more difficult on the new twigs.

In the last few years we have also found *Sphaeropsis* to be associated with perennial, bleeding (resin exudate) cankers on pines. Sometimes the cankers appear in the absence of the tipblight. It appears that an injury is necessary for the cankers to occur. The widespread winter injury in 1996 predisposed many pines to this fungus, and we have received many samples with the bleeding cankers from *Sphaeropsis*.

Sphaeropsis can be controlled using chemicals, especially for situations in which the disease occurs each year and is deforming a specimen tree. Chemicals alone, however, will only do a partial job. This is a difficult disease to control. All dead wood and cones on the tree must be removed. Cankered wood also should be removed where possible, because the fungus can overwinter in the wood. Sanitation methods and fungicide sprays are the best we can recommend. Sprays are made at bud swell, half candle, and full candle. Current fungicide registrations are listed

in the 1996 *Illinois Urban Pest Management Handbook*. Consult *Report on Plant Diseases* bulletin No. 625 for further details about this disease. (Nancy Pataky)

Witches' Broom of Hackberry

A common problem on hackberry, which can be readily seen on most common hackberry trees in Illinois, is a condition called witches' broom. Numerous thin, short, stubby twigs arise close together, often at a conspicuous swelling or knot on a branch. Many of the twigs in a broom will die back in the winter. Buds on the surviving twigs are very numerous, larger than normal, usually grayish, and with looser scales than normal buds. The overall effect on the tree is many clumps of thick growth throughout the canopy.

Witches' broom is thought to be caused by a powdery mildew fungus in association with an eriophyid mite. Observations suggest that the mites may induce brooms and the mildew fungus then invades the deformed buds that result in the formation of the brooms.

The brooms are aesthetically unpleasant to some, but they seem to be a way of life with common hackberry. Sugarberry is also affected, but less frequently. Both Chinese hackberry and Jesso hackberry are considered resistant.

As far as we know, no practical control measures of witches' broom have been reported in the literature. If you need a tree without the brooms, do not plant a common hackberry. If you desire a hardy tree that will outlast you in life span, hackberry will do the job. The brooms will not interfere significantly with tree growth. This disease is discussed in *Report on Plant Diseases* bulletin No. 662. (Nancy Pataky)

HORTICULTURE

Partnership Illinois State Fair Exhibit

Partnership Illinois is a new initiative at the University of Illinois at Urbana-Champaign that is designed to coordinate public service and outreach efforts, increase their impact, and create new opportunities to serve the state. The University of Illinois is sponsoring a Partnership Illinois tent at this year's State Fair (Friday, August 9, to Sunday, August 18) to highlight many of these efforts already in place.

Each day of the fair, the tent will feature an interactive Internet opportunity, information on admission to the University of Illinois, veterinary medicine high-

lights, and an anthropology exhibit. Several "floating" exhibitors are setting up for 1 or 2 days. Some of these include the solar car, World Heritage Museum, Natural History Museum's Discovery Room, Krannert Art Museum, Krannert Center for the Performing Arts, WILL-TV, and WILL-Radio. Food Science will be serving free blue and orange ice cream on each Saturday and Sunday. Several Cooperative Extension Service groups are exhibiting as well on 4-H, parenting issues, government education, and food safety.

Our pesticide safety education team (Rhonda Ferree, Phil Nixon, Bruce Paulsrud, and Bob Wolf) will have a booth on August 11 and 12 emphasizing Homeowner Pesticide Safety. The booth will include a resource area showing homeowners where to get more information about pesticides and a demonstration section. In the resource area, homeowners will learn what a pesticide is, what is on a pesticide label, and how to protect themselves from pesticides they use. Fact sheets about pesticides and pesticide safety will be distributed and examples of other educational resources displayed. The demonstration area of the booth will use fluorescent dye and a blacklight to demonstrate the importance of wearing proper clothing when using pesticides. Examples of protective clothing such as gloves will be displayed. In addition, Pat-the-mannequin will show the proper clothing that homeowners should always wear when using pesticides.

Please visit our tent at the state fair. Each booth is not only educational but fun too. The tent will be located in Happy Hollow along Main Street just inside the fair's main gate. It is directly across from the big slide ride. See you there! (Rhonda Ferree)

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

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HOME, YARD & GARDEN PEST

NEWSLETTER

SEP 05 1996

AG LCRAR

No. 17 • August 21, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Leaf Blotch of Horse-Chestnut

Many of the horse-chestnut trees in central Illinois have become brown in the last several weeks. Actually, they have developed leaf spots that are reddish brown with a very bright yellow margin. This disease is called leaf blotch, and it may also occur on buck-eye. The spots may be small, but in most cases they are large and cover most of the leaf surface. The leaves will become dry and brittle and most likely drop from the tree. In moist weather the fungus forms fruiting structures in the leaf lesions. The fruiting structures are pin-pointed black specks (pycnidia) which contain the fungal spores. The disease will appear like scorch except that the pycnida are found in the lesions and the disease usually affects the entire tree. Leaf blotch generally shows up in July. Scorch would probably be worse on the sun or wind side of the tree and would occur with the first hot, dry weather.

This disease may be serious and treatable in nursery stock, but mature trees usually retain live buds and lose leaves late in the season, so they are not significantly harmed. Removing fallen leaves may be helpful. Also try to prune surrounding vegetation to allow better air flow through the area for more rapid drying of foliage. Do not plant trees close together.
(Nancy Pataky)

Gummy Stem Blight of Cucurbits

The recent case of this disease at the Plant Clinic involved muskmelon, but gummy stem blight occurs on all cucurbits, including cucumber, muskmelon, and watermelon. On squash and pumpkin, the disease is called black rot, but it is caused by the same fungus.

Plants die quickly if infected in the seedling stage. On older plants, all aboveground parts can be affected. You may misdiagnose this disease as insect injury or possibly water stress unless you look closely for signs and symptoms. Leaf symptoms appear as tan, circular-to-irregular lesions and often begin at the leaf margin. Lesions can expand toward the center of the leaf, causing large areas of the leaf to become blighted. Small, black fruiting bodies, pycnidia and perithecia, usually develop on the necrotic tissue. Infection of the stem causes cankers or lesions that are initially oily green and later turn tan. These lesions may exude sap, which then dries to form drops of resin-colored gum (thus the name, gummy stem blight). Lesions can expand to girdle the stem, causing wilt and dieback of entire vines or plants. Fruit symptoms vary on different crops but usually start as small, watersoaked, circular spots. With age, these spots usually darken, and gummy exudate and fruiting bodies may develop in the spots. The fungal pathogen overwinters in infected crop debris and can also be carried on infected seed.

The disease is favored by rainy weather and moderate temperatures. We are seeing the disease more commonly in areas of the state that have had frequent rains. Pruning, picking, and insect wounds can lead to infection, especially on older stems and leaves.

Control measures include crop rotation schedules of 2 to 3 years, planting only disease-free seed and using good sanitation practices (removal of infected



plant debris). Protecting plants with fungicides may be necessary, especially when plants are young. Consider spraying next year if you have seen gummy stem blight this year. Weekly sprays are recommended, beginning when vines begin to run. Commercial growers can choose from Bravo, Benlate, Topsin M, mancozeb, or maneb. Homeowner recommendations can be found on page 216 of the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Brown Rot of Stone Fruit

Brown rot is a fungal disease that will affect peaches, nectarines, plums, prunes, sweet and sour cherries, apricots, almonds, and Japanese quince. The disease causes a rot of the fruit, giving it a fluffy brown appearance—thus, the name brown rot. A fungus called *Monilinia fructicola* causes the disease. This fungus may overwinter in the fruit or in twig and branch cankers.

The *Monilinia* fungus is present in most orchards. It will enter the flower blossoms and cause some death of blossoms, but this phase often goes unnoticed. Growers usually assume this is normal blossom death. The fungus enters the fruit on wounds, especially on fruit that has been wounded by insects or wounded in the picking process. It sporulates on the wounded fruit left on the tree, increasing in abundance as the season progresses. This serves as an ideal site for brown rot to intensify. Each time a ripening variety is picked, the opportunity for disease inoculum to build increases. By the time the late varieties (such as Rio Oso Gem) are picked in September, brown rot may have become a very serious problem.

To avoid bruising the fruit, homeowner fruit producers should pick their peaches when they are still hard but have full color. It is important to remove all fruit so that the brown rot fungus does not produce inoculum on the old, mummified fruit. Also, remove all fallen ripe fruit, another source of inoculum.

Fruit producers have the option of using many different fungicides to help control brown rot. Although spray schedules should have been initiated earlier, it is not too late to spray for brown rot control on late varieties, which may need fungicides more than earlier varieties. Fruit pathologist Steve Ries says that fungicides should be started 2 to 3 weeks before harvest and used on a 7- to 10-day interval. Many

fungicides will work. For homeowners, captan is probably the easiest to obtain. Commercial producers should check the *Midwest Tree Fruit Handbook*. Be certain to read the label carefully for preharvest intervals (number of days before harvest that you can spray a particular chemical). Consult *Report on Plant Diseases* bulletin No. 804 for details on this disease. (Nancy Pataky)

Peony Leaf Disease

Red spot, leaf blotch, and measles are all names for a leaf disease of peony that occurs to some extent every year. It is caused by the fungus *Cladosporium paeoniae*. It is most serious in large plantings, where plants are dense and grown close together, and where the old tops are not destroyed in late autumn or early spring.

Small, circular, red or purple spots appear on the upper surface of young leaves just before the peony blooms. Later, the spots appear on the underleaf surface. The lower sides on infected leaves soon turn a dull chestnut brown, while the upper surfaces appear a glossy dark purple. As the host tissues mature, the lesions enlarge rapidly and may form large, irregular blotches that make affected plants unsightly. Stem and petiole lesions are short, reddish brown streaks at first. The lesions on stems near the soil line become somewhat sunken or pitted and tend to merge and darken. Spots on all plant parts remain purplish or brownish red throughout the season.

There is nothing that can be done to eradicate spots this season. Control of this disease is based on preventive measures. To control the problem for next year's foliage, remove all old tops to ground level and destroy, bury, or remove these from the garden. Either do this in the fall or early next spring before new growth starts. Just before the shoots break through the soil surface in the spring, spray the soil around the plants with mancozeb or maneb. Be sure to soak the soil surface area, stem stubs, and any other peony debris that may remain. Spray the plants weekly during cool, damp, overcast weather, starting when the new shoots are 2 to 4 inches tall and continue until the flowers begin to open. The addition of a spreader-sticker will help coverage. For more information on this disease, consult *Report on Plant Diseases* bulletin No. 631. (Nancy Pataky)

INSECTS

Scouting Report

Annual white grub larvae should be present, particularly in irrigated turf areas. As of August 15, we have not been able to find any in central Illinois. We may be looking in the wrong places. The grubs should be hatched by now, and treatment in areas with at least 10 to 12 per foot square should be made.

Black turfgrass ataenius second generation eggs hatch at this time while rose of sharon is in bloom. This small white grub feeds on turfgrass roots and causes damage similar to that caused by other white grubs. Damage is most likely on highly maintained turf such as golf greens and fairways. Controls applied for annual white grub or Japanese beetle grub also control this generation of this insect.

Sod webworm thrives under hot, dry conditions. Watch for browning turf that does not respond to irrigation. Disease organisms keep sod webworm under control most of the time, but the diseases are not a major factor when the soil is dry. Scout for this insect in the same way as for black cutworm. Two to three caterpillars per foot square is enough to cause damage. Control options are the same as those given for black cutworm.

Mimosa webworm is present in central Illinois on honey locust. These second generation caterpillars will be most numerous feeding in the old damage of the first generation. Look for slender, grayish to greenish, active caterpillars in brown leaflets held together with silk. Sprays of *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) as well as several chemical insecticides are effective.

Leafcutter bee damage is numerous in Illinois at this time. These bees create 1/4-to 1/2-inch diameter holes in the leaves of red bud, sugar maple, rose, and other trees and shrubs. The holes are perfectly circular and are made just inside the leaf margins. The bees use these leaf pieces to line their larval cells in hollow plant stems and other hollow areas. No control is recommended. (*Phil Nixon and John Lloyd*)

Black Cutworm

Black cutworms are appearing on golf greens in central Illinois. This insect has several generations per year and warrants scouting by golf course personnel throughout the growing season.

Black cutworms do not overwinter in Illinois but fly up from the southern United States each year. Eggs are laid on the tips of grass blades with the result that mowing removes them. The young caterpillars that hatch from the eggs curl up in the grass during the day and feed at night. Fully grown larvae are grayish to blackish and 2 inches long. The life cycle lasts 4 to 6 weeks, with several generations occurring throughout the spring, summer, and fall.

The caterpillars feed on grass blades at night. Large cutworms can eat all of grass blades in a 2- to 3-inch, roughly circular area that is brown due to the exposed thatch. In closely mowed turf, such as golf greens, cutworms will migrate several feet out onto the green at night to feed. This can result in heavier damage along the edge of the green. The practice of dumping clipping baskets at the edge of the green tends to concentrate the mowed-off eggs in that area. Robins, cowbirds, starlings, and other blackbirds cause damage to golf greens when feeding on the black cutworm caterpillars. The birds make holes that are 1/4 to 1/2 inch across. Most of the time this feeding is not a problem and helps reduce cutworm feeding damage. On greens and fairways where the grass is closely mowed, this damage can be very important. The change of direction of a putt due to hitting one of these holes can become very important on a golf course. In heavy infestations, large areas of turf may be torn out by the birds.

Scout for cutworms by applying an irritant solution to the turf. Mix a tablespoon of 2 percent pyrethrin or dishwashing detergent in a gallon of water, and apply this mixture to a foot square turf area with a sprayer or watering can. The cutworms, as well as sod webworms, will come to the surface within 5 minutes. Keep an eye on the area because irritated caterpillars will commonly tunnel back into the turf after a few seconds. Four or more cutworms per foot square is high enough to justify control. Golf courses requiring very high quality greens or those preparing for major tournaments may wish to treat with lower numbers. Pyrethrin is sold as fly spray and vegetable garden spray. If 2 percent pyrethrin is not available, an equivalent amount can be used such as 2 tablespoons of 1 percent or 1 teaspoon of 6 percent.

Control black cutworms with applications of chlorpyrifos (Dursban), trichlorfon (Dylox, Proxol), or bifenthrin (Talstar). Carbaryl (Sevin) is effective against cutworms but can cause the caterpillars to

become especially active before they die—attracting birds and resulting in more damage. Nematodes, such as *Steinernema carpocapsae* (Biosafe, Vector), have also been shown to be effective against cutworms. (Phil Nixon)

Zimmerman Pine Moth

Treatments for the Zimmerman pine moth should be applied in mid- to late August. Adult female moths will begin emerging around early to mid-August, mate, and then begin laying eggs in bark cracks and crevices. Preferred hosts include Scots and Austrian pines.

After egg hatch, the young larvae will wander around on the bark surface and eventually spin a cocoon-like structure in preparation for winter. The following spring in mid to late April, the larvae will become active again, bore into the bark, and begin feeding. These larvae mature through the summer, pupate, and emerge as adult moths in August. There is one generation per year.

Larval feeding under the bark results in a girdling effect causing death of the branch and flagging later in the season. Larval feeding usually occurs in the branch crotch areas of the host tree. Feeding for several years can result in a weakening of the trunk and the top breaking out of the tree. Several lateral branches will become the new leaders resulting in a multi-trunked tree. Younger trees usually experience the greatest damage.

Control of the Zimmerman pine moth can be achieved by applying a trunk and branch spray of chlorpyrifos (Dursban) or dimethoate (Cygon) in mid to late August. Thorough coverage of the bark is important for effective control. One application should be adequate for control. Applications of the same insecticides in April when the larvae are again active on the bark surface are also effective. (Fredric Miller and Phil Nixon)

Fall Webworm

Nests of the fall webworm are present throughout Illinois. Numbers are high in some areas of southern and central Illinois. Inside these nests are straw-colored larvae which are very hairy and about 1 inch long.

The fall webworm feeds on almost all shade, fruit, and ornamental plants except conifers. Feeding by the larvae may range from 4 to 6 weeks, with the entire plant totally engulfed with webbing if populations are heavy. The larvae pupate in late summer and then overwinter as a pupa under the bark of trees.

Control of fall webworm can be achieved by pruning out the webs when they are first noticed. Foliar sprays of acephate (Orthene), carbaryl (Sevin), malathion, Dursban (chlorpyrifos), or *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) may be applied for large plantings or where pruning out nests is not practical. (Fredric Miller)

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SEP 11 1996

AG Library

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HORTICULTURE

Scouting Weeds

Scouting is the key to any successful weed management program. In order to develop a customized and effective weed management program, we must identify the weed species present and document their distribution, their abundance, and the possible reasons for their occurrence.

Although weed scouting is a continuous process, a thorough evaluation should be done at least once a year. Late summer/early fall is an ideal scouting time. At this time, all types of weeds—summer annuals, winter annuals, biennials, and perennials—are present and easily identified. The winter annuals are young and more easily controlled in the fall than in the spring. Perennial broadleaf weeds are also more easily controlled in the fall. For turf, site modification, repair work, and reseeding can take place in the fall. Knowing the weed problems now will allow ample time during the winter to reassess the current weed management program.

The scouting process should include a weed map to construct a picture of the weed population and distribution. Divide the landscape beds, turf areas, or the property into management units. On commercial sites, you may also wish to reflect the priority status of each area, noting areas where lower aesthetic injury levels for weed infestations exist. Walk or ride each unit in a zig-zag pattern, stopping at key indicator areas.

Identify and map the weeds present, paying particular attention to those which have escaped previous control procedures, those which occur in patterns, species known to be troublesome in your area, and species new to the site. It is not necessary to identify and count each weed on the property. For example, a complex of easily controlled broadleaf weeds may simply be identified on the map as broadleaves. On the other hand, if a single weed species dominates the population, it certainly should be identified and mapped separately. This is especially true for difficult-to-control perennial weeds such as quackgrass, yellow nutsedge, field bindweed, and ground ivy.

A good scouting report, along with the aesthetic injury level for each area, will determine the degree of control needed and, thus, the method to use. Typically, an integrated approach using preventive, mechanical, cultural, biological, and chemical control measures is used. (Rhonda J. Ferree)

INSECTS

Scouting Report

Sod webworm moths are numerous in central Illinois. These moths lay eggs into the turf that hatch as caterpillars 2 weeks later. Sod webworm caterpillars succumb to disease under cooler, wetter conditions, making control efforts less useful. If the weather is hot and dry, insecticide applications may be needed once caterpillars hatch. Additional information on sod webworms was given in the last newsletter.

White grubs have been found in marginally damaging numbers in northeastern Illinois. The grubs were still about 1/8 inch long during the last week of August. This makes damage unlikely in northern

Illinois before mid-September. Grubs are patchy in occurrence in central and southern Illinois, with spots of damage likely in untreated areas in September.

Japanese beetles are still present and feeding on ornamental plants in northeastern Illinois. Very few beetles remain in central and southern Illinois, making control efforts less useful in those areas of the state. Some treatment with carbaryl (Sevin) or synthetic pyrethroids may be needed yet in northern areas of the state.

Birch and alder leafminer damage by second generation insects has been observed by Rex Bastian, with the company Hendricksen the Care of Trees in the Chicago area. If mines are new, numerous treatments with systemic compounds such as acephate (Orthene) may reduce the aesthetic damage caused by these pests.

Zimmerman pine moth can still be treated in northern Illinois by spraying the trunks with chlorpyrifos (Dursban) or dimethoate (Cygon). Young caterpillars may have found overwintering sites in central and southern Illinois, making control efforts less effective.

Fall webworm continues to be present throughout the state in fairly high numbers. Control at this time of year is not necessary for the health of the tree because leaves that are eaten now will soon fall anyway. The adult moths that emerge next year are very mobile and are likely to fly to new areas to mate and lay eggs. Thus, reduction of caterpillar numbers this year will probably have little effect on the numbers present on the same trees next year.

Yellownecked caterpillars continue to feed, but control efforts may not be needed for the same reasons as for fall webworm above.

Greenbugs have been identified by Don Meyer, Extension Unit leader in Mclean County, who found them on the edge of a rust-colored area beneath a red maple in his neighborhood. Greenbugs are aphids that feed on grass stems. Treatments should be initiated when the rust-colored grass appears and greenbugs are detected at the edge of these areas. Acephate (Orthene), chlorpyrifos (Dursban), and insecticidal soap will provide control of green bugs. Areas treated with insecticidal soap may require reapplication after 5 days. (*Phil Nixon, John Lloyd, and Bruce Spangenberg*)

Bark Beetles on Pines

Bark beetle damage on pines has become common through the latter part of the summer. Damage appears

as holes as thick as a pencil lead along the main trunk and major limbs. The adults are blackish to brownish beetles about 1/8 inch long.

Over the past 2 years, wet springs, dry summers, a very cold winter, and a warm winter have combined to put many conifers under stress. Bark beetles attack trees that are under this environmental stress or construction injury. Once beneath the bark, adults lay eggs that hatch into small grubs that bore beneath the bark. Grubs eventually hatch into adults that re-infest the declining tree. Bark beetles on pines have several generations of adults from mid-April through mid-September. Many bark beetles feed on both pine and spruce.

Large numbers of bark beetles (>100 per square foot of bark) can emerge from declining trees carrying a blue staining fungus that attacks the plant vascular system. This fungus can be passed to new trees when attacked by the adult bark beetles. Because unhealthy trees produce compounds that are attractive to bark beetles, it is recommended that dead and dying trees in a clump or windbreak be promptly removed to reduce their attractiveness. While being attracted to the dead or dying trees, many beetles will land on nearby healthy trees and try to become established.

Healthy trees can often withstand attack from small numbers of disease-infested bark beetles. The fungus trips off a chemical switch that causes the trees to produce large quantities of toxic compounds called monoterpenes that kill beetles and fungi. A healthy tree can succumb to beetles when repeated attacks by the beetles deplete its energy reserves and reduce its capacity to defend itself.

Insecticides are usually not recommended for the control of bark beetles in infested trees. Removal of the trees is more effective because heavily infested trees are usually dying anyway and cannot be saved. Removed trees should be chipped, burned, or buried to eliminate the emergence of beetles. If infested trees cannot be removed due to property rights or other reasons, healthy trees may benefit from sprays of chlorpyrifos (Dursban) while the bark beetles are flying. (*Phil Nixon and Cliff Sadof, Purdue University*)

Chinch Bugs

Chinch bugs are being found in turf in northeastern Illinois. These insects are small, about 1/8 inch long and black and white as adults. Nymphs are smaller and may be grayish or red and white, depending on their stage of development.

Chinch bugs feed deep at the base of the turf, sucking out the juices of the plants. Damage appears as straw-brown areas. In Illinois, damage is most frequent in thatchy lawns in full sun. Damage may also stop along a property line between lawns where the cultural practices of the two owners are different. A fungus, *Beauveria bassiana*, attacks chinch bugs and is more prevalent during moist, warm weather. This fungus may help explain why chinch bug damage usually occurs during hot, dry weather outside tree canopies.

Chinch bug damage occurs most commonly in northeastern Illinois where hairy chinch bug (*Blissus leucopterus hirtus*) occurs and in the Belleville and Collinsville area where chinch bug (*Blissus leucopterus leucopterus*) is located. Damage rarely occurs elsewhere in the state, and the species causing that damage is not yet known.

Detect chinch bugs by moving the grass blades apart with your fingers so that you can see the base of the plants. If chinch bugs are detected, sink a coffee can with both ends removed into the soil and fill it with water. The chinch bugs will float to the water surface. A continuous mass of chinch bugs at the edge of the water surface next to the can indicates that there are sufficient numbers to cause damage.

Sprays of chlorpyrifos (Dursban), diazinon, trichlorfon (Dylox, Proxol), or bifenthrin (Talstar) should provide effective control. Remember that diazinon is not labeled for use on golf courses and sod farms. (*Phil Nixon and Bruce Spangenberg*)

PLANT DISEASES

Plant Clinic Closes September 13

It doesn't seem possible that we could be so near the end of another summer, but there only a few weeks left before the Plant Clinic closes for the season. September 13 will be the last day that samples will be received at the clinic. After that date samples will have to be handled as necessary by individual Extension offices or by campus specialists.

Many of you have asked whether the clinic could stay open longer. Unfortunately, this is no longer an option. The diagnostic staff becomes a skeleton crew after September 13, and it takes until the end of the month to finish all samples that are still in culture or that need extra help. October has already been booked

with meetings, preparation time, and publication deadlines. In the past, when we tried to continue to handle samples, clients all too often did not understand that we had no choice but to fit them in as time allowed. There was much anxiety, too, as we always try to please everyone. We have reluctantly concluded that this year there can be no exceptions. The clinic will close September 13.

After the closing date, if you have a plant problem, the first step should still be to contact your local Cooperative Extension Service. If it is then determined that you need help from a specialist, the following contacts may be helpful:

Insect problems	Phil Nixon or John Lloyd	333-6650
Disease problems	Nancy Pataky	333-2478
Tree/shrub care	Dave Williams Floyd Giles	333-2126 333-2125
Turf care	Tom Voigt	333-7847
Herbaceous plant problems	Jim Schmidt	244-5153

I would like to thank many of you who have helped to inform me of problems that were occurring in your area. This newsletter is meant to help explain problems that we have been seeing as well as to predict problems that you might soon see. If you have suggestions for next year, please take a minute to drop a note to the Plant Clinic, attention Nancy. (*Nancy Pataky*)

White Pine Problems Continue

Over the past summer we received a total of 105 pine samples at the Plant Clinic. The majority of these have been white pines. The white pine problem is the problem we are discussing here. A wave of samples arrived in the spring, fewer in June and July; in August, there was a recent resurgence of problems. The symptoms include some pattern of needle yellowing or browning, shriveled bark on branches or trunk, sap exudate on branches, and often a sudden death of the tree. The trees range in size from 2 ft to 20 ft or more. Samples have come from all corners of Illinois. Reports from other clinics confirm that the

problem is occurring throughout the Midwest.

Staff at the Plant Clinic have tested many of these samples for the presence of pinewood nematode (not usually a host), and are happy to report that it has not been found. We have also cultured for needle and stem fungal pathogens and find nothing there as well. Because root rot fungi can cause root decline and subsequent top dieback, we have also done root cultures for these pathogens and again find nothing. It does not appear that this is an infectious disease problem.

This sort of problem will probably generate many theories that can never be proven one way or the other. The following is part fact and part theory as we see the situation from our clinic. Possibly this will be of help.

White pines thrive as understory trees in the cool, moist, well drained soils of Wisconsin. We can grow them with intermittent success in Illinois. Many of the problem trees we have seen or discussed have been from tight clay sites exposed to the elements (wind break trees). It is likely that site stress has contributed to the decline of these trees. In a few cases where we have seen roots, the outer layer easily pulls off, exposing the brown, dead tissue below. The excessive rains of the past 2 years may also have contributed to root injury and decline by saturating the soil and causing a lack of soil oxygen. It does not appear that mechanical injury or chemicals are to blame. In most cases, the trees were in established sites with no chemical usage reported and no traffic over the roots.

The spring injuries that we saw were often related to freeze/thaw injury of the past winter. This was

particularly the case with young trees or recent transplants. White pines have shallow root systems and are sensitive to temperature changes. The young trees cannot tolerate as much root injury and may have been injured by the freeze/thaw of the winter.

The recent resurgence of samples is likely the aftermath of hot, dry weather. A tree with poor roots is more likely to show top death in stressful conditions. Heat and drought are definitely stressful.

There is also the possibility that a root rot has been involved in some cases. Both white pine root rots, *Phytophthora* and *Procera*, only invade in very wet conditions. There is no chemical treatment for landscape trees infected with these root rots. Control usually centers around improving drainage and preventing water logged soils.

Since most of these white pine problems are not an infectious problem, we do not advocate quick removal of the apparently dead trees. Give them a chance to recover, and do not remove them until you are certain that they are dead. Try digging in the root system (carefully) and looking at a few of the roots. If they are brown in cross-section and the outer layer pulls off easily, or is not present, then root injury has occurred. If the roots are white and healthy, then the problem is an aboveground problem and our theory is wrong. A light application of a balanced fertilizer may help to give trees a boost. If periods of drought occur, water the trees to keep them vigorous. All you can do is pamper affected trees and hope that weather conditions permit their recovery. In the future, do not plant white pines in tight clay soils on exposed sites. (Nancy Pataky)

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COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST

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illinois at urbana-champaign ▲ illinois natural history survey, champaign

NEWSLETTER

No. 19 • September 18, 1996

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Conifer Root and Trunk Feeding Weevils

It is time once again to think about treating for Pales weevil and northern pine weevil. These weevils can cause severe problems in Christmas tree plantations and tree nurseries where young pines are planted next to tree stumps. The weevil larvae develop through the summer in the roots of stumps and dead conifers. The adults of these two species plus the root collar weevil begin emerging from pupal cocoons in late August and early September. After doing a little twig feeding, the adults overwinter in the litter surrounding the trees. In the spring, the adults become active and begin feeding on the trees.

In the spring, the adult weevils are attracted by the odor of fresh pine resin. They mate and the females lay eggs in notches in the bark of weakened and dying trees. Northern pine weevil larvae hatch from the eggs and burrow into the cambium of stumps to feed. Pales weevil hatches from the eggs and tunnel into the roots on which it feeds. Pine root collar weevil larvae feed on the inner bark of the root collar.

Pales weevil and pine root collar weevil adults are black snout weevils with a reddish brown tint approximately 1/3 of an inch long. Northern pine weevils are smaller and have a lighter brown color with white marks on their elytra (wing covers). The larvae of these beetles are all yellow-white, legless, C-shaped grubs.

Adult weevils generally live for 2 years and will lay eggs each spring. Adult feeding causes wounds on

twigs that ooze sap and turn brown in early summer. Larval feeding of pine root collar weevil through the summer kills trees by girdling them. Active infestations can sometimes be diagnosed via the accumulation of resin and pitch at the base of the tree or around the root collar.

Proper sanitation is the most effective way to reduce northern pine and Pales weevil populations. In plantation and nursery situations, sanitation can be accomplished through removing fresh cut stumps and weakened or dead trees. Current recommendations for chemical control call for drenching cut stumps with chlorpyrifos (Dursban) in mid-August with similar treatments to stumps and seedlings in mid-April. Root collar weevils can be controlled with lindane drenches to the trunk base and beneath the tree canopy. These treatments are intended to kill the new adults as they emerge in the fall and to kill the overwintering adults before they have a chance to lay eggs in the spring.

(John Lloyd)

Scouting Report

Japanese beetles are still present in small numbers and feeding on ornamental plants in central and northern Illinois. Fall webworms and yellow-necked caterpillars continue to be present throughout the state in fairly high numbers. Control at this time of year is not necessary for the health of the tree because leaves that are eaten now will soon fall anyway.

American Dagger Moth

American dagger moth larvae are common this fall throughout Illinois. The larvae are striking in appearance; they are long-haired and fuzzy like woollybear caterpillars with long, black, slender hair tufts. They vary in color—the fuzzy hair is white to yellow. Illinois caterpillars tend to be yellow.

These caterpillars feed on maple, apple, crabapple, basswood, and willow. They can occur in high enough numbers to cause severe defoliation, even though this



late-season defoliation impacts the tree very little. When fully grown, they migrate to pupation sites and may be found in large numbers crawling through lawns.

Hairs on these caterpillars appear to be somewhat irritating. Recently and in previous years, we have received calls reporting rashes and eye irritations. These are most common in children that handle and play with the caterpillars extensively. Rubbing the eyes while having detached hairs on the hands probably accounts for the eye irritation. Reaction appears to vary—some people are more sensitive to insects than others.

If necessary, these insects can be controlled with the typical caterpillar sprays such as *Bacillus thuringiensis kurstaki* (Dipel, Thuricide), carbaryl (Sevin), and others. (Phil Nixon)

Biological Control Conference

The University of Maryland Cooperative Extension Service is sponsoring a conference entitled "Innovative Plant Management: Focus on Biological Control" on November 7 to 8, 1996 at the University of Maryland campus in College Park, Maryland. This national conference for greenhouse, nursery growers, and turf managers will concentrate on currently available beneficial organisms and methods of management to maximize control of insects and diseases. Experts from across the United States will share their expertise in general and hold laboratory sessions in each area on both days. Registration for the full conference is \$125. For registration and travel information, contact Stanton Gill, University of Maryland Cooperative Extension Service, at (301)596-9413, or access the official announcement on the World Wide Web at <http://www.agnr.umd.edu/events/IPM.htm> (John Lloyd and Phil Nixon)

Aster Yellows

The University of Illinois Plant Clinic recently received flowers suspected to be infected with aster yellows. This disease is produced from infection by a phyto-plasma and is only transmitted from plant to plant by leafhoppers, primarily the aster leafhopper.

A very wide variety of plants are affected by aster yellows. Typical symptoms on flowers include a loss of normal petal formation, resulting in a more disorganized, somewhat leaf-like form. Foliage of some infected plants (for example, petunia) tend to turn yellow while others (for example, statice and marigold) show a reddish or bronzing color change. As

symptoms progress, there is dieback of flowers and ultimately death of the plant. Vegetables that are commonly infected (and their symptoms) include carrots (hairy roots, dense "witches broom" of top growth, leaf bronzing), lettuce (twisted head, dark spots of latex, yellowing/mottling), and celery (similar to lettuce).

Leafhoppers capable of transmitting the pathogen must first feed on a plant that is infected. A latent period of 10 to 14 days must pass between the time the leafhopper feeds on an infected plant and acquires the pathogen and when it subsequently is able to transmit the pathogen to new plants. During this period, the aster yellows' phytoplasma actually migrates into the body of the insect and reproduces within its cells. The leafhoppers are rendered infective (capable of infecting new plants) only after sufficient amounts of the organism have migrated to their salivary glands. This behavior of the phytoplasma raises the question of what came first—activity as an insect pathogen or as a plant pathogen? Once the leafhoppers have acquired the aster yellows organism and the required latent period has passed, the leafhoppers can transmit it for the rest of their lives—several weeks to months.

Control of aster yellows has primarily involved control of the vector with insecticides, attempting to kill the insect on plants before it can successfully transmit the pathogen (a process that takes about half an hour). Pyrethroid insecticides have been superior in this regard, but even they require frequently repeated application. (Adapted from an article written by Whitney Cranshaw, Colorado State University)

Correction to Issue 18

Under "Scouting Report," the second sentence in the fourth paragraph—on birch and alder leafminer damage (page 2)—should read, "If mines are new and numerous, treatments with systemic compounds such as acephate (Orthene) may reduce the damage caused by these pests."

PLANT DISEASES

Plant Clinic Closed until May

This is just a reminder to those of you who did not read last week's issue of the newsletter. The Plant Clinic is now closed for the fall and winter but will resume operation May 1, 1997. Please refer to issue number 18 for details. (Nancy Pataky)

Rusts on Turf

We have received several reports this past month of lawns with orange tints or patches developing and spreading. This is due to fungal diseases called rusts. All turfgrasses can be infected with rust fungi, although Kentucky bluegrass, perennial ryegrass, tall fescue, and zoysiagrass tend to be most susceptible. Grasses growing slowly under stressful environmental conditions are most susceptible, particularly when water, fertility, and soil compaction are inadequate for good growth.

Early symptoms of rust diseases are light yellow flecks on leaves and stems. The flecks enlarge until spores of the fungus are produced, causing the leaf tissue to rupture and expose powdery, spore-filled spots called rust pustules. The pustules may be yellow, orange, brown, or red. The spores rub off very easily on hands, shoes, clothing, and animals. These diseases are called "rusts," because of the resemblance of the pustules to metal rust. Severely infected turf appears thin and tinted yellow, red, or brown, depending on the rust fungus causing the disease. The turf becomes weakened, unsightly, and more susceptible to injury from environmental stresses and attack by other pathogens.

For most rust diseases on turf, disease development and spread are favored by 4 to 8 hours of low light intensity, temperatures between 70° and 80°F, high humidity, heavy dews or light rains, followed by 8 to 16 hours of high light intensity, high temperatures, and slow drying of leaf surfaces. There are a few cool-season rust fungi.

Since rust occurs mostly on slow-growing (stressed) turf, control measures should be targeted to these areas. Leaf wetness is required for infection; therefore, it is important to water thoroughly early in the day so the turf can dry before night. Water turf infrequently but to a depth of 6 inches or more at each watering. Avoid frequent, light sprinklings. Fertilize to keep the grass growing about 1 inch per week in summer and early fall droughts. Use a balanced fertilizer, and do not apply excessive nitrogen. As the grass grows, it pushes rust-infected leaves outward so they can be mowed and removed. Mow regularly to remove infected leaf tips, but avoid mowing below the recommended height for the particular turf species/cultivar. Prune surrounding trees and shrubs to improve light penetration and air circulation around densely shaded areas.

Badly infected areas of turf may have to be renovated and reseeded. Be certain to use a blend of turf

cultivars with resistance to rust, as listed in *Report on Plant Diseases* bulletin No. 412. If rust continues to be a problem over several years, a preventive fungicide spray program may be necessary. Products registered for rust control are listed in the 1996 *Illinois Urban Pest Management Handbook*. (Lindsey du Toit)

Rose Cane Cankers

Roses in Illinois were severely injured last year because of winter stress. As a result, many were removed and replaced, but others were pruned and rejuvenated. A common problem on injured roses is the development of cankers. Three canker diseases (brown canker, stem or common canker, and branch canker) are common in Illinois and are generally confused with winter injury or other problems.

The first symptoms are small, roundish lesions in the canes. The spots are pale yellow, reddish, or bluish purple. They gradually enlarge, turn brown or grayish white (often with a darker margin), and may partially or completely girdle the cane. Complete girdling results in dieback or poor growth of the plant parts above the affected areas. Cankered areas are sprinkled with black, speck-sized, fungal fruiting bodies. When left unchecked, infections may spread downward into the crown, causing entire rose plants to wilt, wither, and die. Infection occurs chiefly through a wide variety of wounds, including thorn abrasions. Infections may also occur on the leaves and flowers.

Good sanitation is critical to control these cane diseases. Prune the canes in fall and in early spring, according to the type and cultivar grown. Remove and burn or haul away with the trash all infected, dead, and weak parts of canes, as well as infected leaves, flowers, buds, and hips. When pruning cankerous stems, cut back to a strongly growing shoot or branch at least 2 to 3 inches below any sign of infection. Before each cut, dip the shears in a disinfectant such as 10 percent Clorox or 70 percent rubbing alcohol. Use sharp tools to make clean, slanting pruning cuts no more than 1/4 inch above a node.

When planting new rose bushes, use only top-quality, disease-free plants from a reputable nursery. The plants should be free of cane bruises or colored spots. Bargain roses are often infected. Maintain plants in high vigor by proper planting, spacing, fertilizing, watering, winter protection, and thorough fungicide spraying. Start as the buds break open in the spring, and continue at 7- to 10-day intervals into September or early October. The fungicides that

control black spot usually control cankers as well, so no additional spraying is required. Adding a spreader-sticker material to the spray, however, helps wet the canes for better protection.

Consult *Report on Plant Diseases* bulletin No. 626 for more information on rose cane cankers. Chemical options are listed on page 95 of the *1996 Illinois Urban Pest Management Handbook*. (Nancy Pataky)

Cytospora Canker of Spruce

Many spruce trees have shown branch decline and poor growth over the last several years of environmental stress and dieback. They seem to be looking better in many situations this year, but a lingering problem is *Cytospora* canker. This disease is the most common and damaging disease of spruce in Illinois. Colorado blue and Norway spruce are very susceptible, especially when they are between the ages of 15 to 20 years.

Symptoms include a browning of needle tufts at the branch tips, followed by death of the entire branch. Usually, lower branches are affected, and less frequently, the death of branches occurs at the tree's center or near the top. The needles may drop early from affected branches or hang on for several months, leaving dry, brittle twigs. The disease can continue to spread until all the branches and the tree are dead. Conspicuous patches of white resin commonly form on the bark in cankered areas. The diseased tissue is brown underneath the thin layer of outer bark. Black pinhead-sized fungus fruiting bodies (pycnidia) form in the dead inner bark. Examine some of the resin area and surrounding wood, and look for the diagnostic pycnidia to confirm this disease. Examining dead branch tips might lead to an erroneous or ambiguous diagnosis.

There are no chemical controls to prevent infection or eradicate this fungus. Remove dead branches as they occur (prune in dry weather), and try to improve tree vitality. Apply a thick organic mulch under the full spread of the branches to maintain more consistent conditions for roots. Water trees thoroughly

during extended dry periods and fertilize in the fall with a general tree fertilizer.

For more information about *Cytospora* Canker of spruce, consult *Report on Plant Diseases* bulletin No. 604. (Nancy Pataky)

HORTICULTURE

Plant Stress and Early Fall Color

Stress is defined as exposure to extraordinarily unfavorable conditions. One sign of plant stress that we see at this time of year is early fall coloration. Many plants, including burning bush, river birch, crabapple, flowering dogwoods, Callery pear, and certain red maple cultivars, are exhibiting early fall coloration.

Normal fall coloration and leaf drop are triggered by a combination of several factors. Plants prepare for discoloration and leaf fall by the shortening days. Then, as soon as the temperatures fall below threshold values, plants further prepare for leaf fall and winter dormancy. Other factors can also affect this phenomenon, including water stress (flood or drought conditions) and nutrient deficiency. With shorter days, some plants under stress will start discoloration before temperatures reach the threshold values.

Although early fall coloration is an alarm response to a stress condition, it does not necessarily represent a threat to the life of the plant. The source of plant stress must be determined. By far, the majority of plants showing early coloration are undergoing drought stress. This is especially true of new plantings and typically is a result of the failure of the roots to supply sufficient water to the leaves.

Water stressed plants now to encourage recovery growth and root revival. Apply enough water to penetrate deeply within the drip line. Never overwater. To prevent plants from sending out succulent, frost-susceptible growth, avoid fertilizing or pruning until the plants are dormant. The added water will not reverse the early coloration but will better prepare the plant for winter and, possibly, for less future decline. (Rhonda Ferree)

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Major authors are Phil Nixon and John Lloyd, (217)333-6650, Fredric Miller, (708)352-0109, and Tom Royer, (618)692-9434, entomologists; Nancy Pataky, plant pathologist, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217)333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. This issue was edited by Francine Weinbaum, typeset by Jerry Barrett, and proofread by Herbert Morgan, all of Information Services.

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No. 20 • October 2, 1996

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Last Regular Issue for 1996

This is the 20th issue of the 1996 *Home, Yard, and Garden Pest Newsletter*. There are only 2 issues remaining. An issue printed in late November will provide winter plant protection topics as well as information on some of the winter educational meetings. The final issue of this subscription year will appear in early February. It will contain the annual index of topics covered over the 22 issues and also address new pesticide changes for 1997 as well as any pertinent pest problems. Next year's subscription will start in April 1997. (Phil Nixon)

PLANT DISEASES

Disease Avoidance in the Landscape

My plant is dying, what should I spray? Sound familiar? In most cases, curative or rescue treatments are not available for plant diseases. In fact, disease problems in the landscape are most easily managed on a preventive basis. Listed here are a few suggestions on steps that can be taken now to avoid, or at least lessen, disease problems in the future.

- Keep the grass mowed until it stops growing—to help prevent damage from fungal snow molds and winter injury.
- Prune trees and shrubs to remove all dead and cankered wood. This will help promote callous growth and will prevent secondary wood rot problems.

- Prune ornamental fruit trees and dense woody plants to promote faster drying. This will reduce foliar and stem disease infection. Of course, proper pruning procedures must be followed.
- Provide suggested winter protection for roses, evergreens, young thin-barked trees, and other sensitive plants. Injuries are potential sites for infection by canker fungi.
- Removal and burning (where possible), composting, or burying plant debris will help control foliar and stem disease for next year. The fungal organisms will survive the winter on such debris and reinfect next spring when weather conditions permit.
- Look over a variety of seed and nursery catalogs. Select resistant varieties with desirable horticultural traits. Choosing disease-resistant hybrids, varieties, and species is usually the least expensive and most efficient method of disease control.
- Make a map now of the flower and vegetable locations you used this year. Next year, rotate related plants to other areas of the garden to avoid vascular, and root and crown rot pathogen buildup.
- Now is an ideal time to make soil amendment changes and take action to improve drainage in and around planting beds.
- Divide perennial flowers that have become dense and poor in vigor. Remove rotted or other diseased parts, and replant in a new location where possible. Root and crown rot problems may thus be avoided.

You cannot anticipate every disease problem that may arise in your landscape. Still, these basic procedures will help lessen problems that do occur and will likely avoid many others that you will never know about. Best of all, you get to enjoy this wonderful season! (Nancy Pataky)



Sclerotinia White Mold

The symptoms of white mold are fairly obvious. Bleached areas appear on the stems and at leaf axils. These areas have been described as looking like animal bones dried in the sun. In cool, wet weather, a white fluffy mold develops on the bleached areas. Within 7 to 10 days sclerotia form on the outside of the stem or even within the stem. Sclerotia are the resting or overwintering stage of the fungus. They are black and irregular in shape but as large as rabbit droppings. Infected stems die, so symptoms include dieback or death of plants.

There are many plants that may host this disease. Most are listed in the *Report on Plant Diseases* bulletin No. 1008. Some commonly infected plants include begonia, daisy, delphinium, green pepper, hydrangea, marigold, pansy, tomato, and zinnia.

This disease is caused by the *Sclerotinia* fungus. It is a disease of cool, wet weather. Many parts of Illinois have had periods of cool, wet weather this year, but the Chicago area probably wins the award for the area most likely to have white mold. Alternating wet and dry periods are ideal for fungal infection and growth.

Control options are limited. Try to avoid dense planting with poor air movement. Plants that dry quickly are less likely to be infected. There are no rescue treatments, even for commercial growers. Fungicide applications may help on a preventive basis in areas where this is a problem every year. These are listed in the *1996 Illinois Urban Pest Management Handbook*. Rotation is another option, since the sclerotia can remain in the soil and viable for many years, until weather conditions again favor fungal development. (Nancy Pataky)

Pine Wilt Update

Pine wilt was discussed in detail in Issue No. 5 of this newsletter. Compared to those in most years, the incidence of positive cases of pine wilt was fairly low this year. This disease may still show its ugly head this fall, and you need to keep an eye out for symptoms. Infected trees need to be removed as soon as possible to prevent further spread in your area.

Watch for flagging (the appearance of entire branches that are dead) or sudden decline and death of an entire pine within a few weeks or months of initial symptoms. Scotch pines are most commonly affected in Illinois (possibly because we have so many Scotch pines), and the disease generally affects 15- to 20-year old trees. We have found that Austrian pines are more likely to show flagging and may show only a tip dieback at first.

The Plant Clinic is closed, so samples cannot be tested for pinewood nematodes. If you have a suspect

tree that has died, remove it as soon as possible. The wood must be burned, buried, or chipped (composting chips is suggested). Refer to the previous pine wilt article for information on use of wood for landscape chips. No pesticides are known to be effective in the control of this disease. Consult *Report on Plant Diseases* bulletin No. 1104 for details on pine wilt. (Nancy Pataky)

HORTICULTURE

Winter Preparation for Ornamental Plants

In the last issue we discussed early fall coloration. Since many plants are stressed, basic winter preparation work is all the more important. The first step in avoiding winter damage or injury is to select plants that are winter hardy for your area. Healthy, well maintained plants in general will survive the winter better. Below are several items to consider in preparing plants for winter.

Woody Plant Preparation

Adequate watering is essential in the fall to assure that plants go into the winter months with a good supply of moisture in the soil around the roots. This is especially true for plants susceptible to winter burn such as broad-leaf evergreens (azaleas, hollies, boxwoods, and rhododendrons), narrowleaf forms (junipers, yews, and arborvitae), and plants susceptible to salt damage (see Issue No. 2, page 2).

Fall is an excellent time to fertilize landscape plants. Although the tops of the plants appear dormant, root growth (and thus nutrient uptake) continues late into the fall. For more information, obtain *Horticulture Fact Sheet* NC-9-84, "Fertilizing Woody Plants."

One way to help prevent rapid moisture loss through the leaves or needles is with antitranspirants. These are wax-like products which are sprayed on the leaf surfaces to slow down transpiration. Antitranspirants should be applied before severe winter sets in.

Other types of cold injury include sun scald and frost cracks, which occur due to extreme temperature fluctuations. Sun scald is actually a freezing injury and is most likely to occur on young trees. Sun scald spots may develop into a frost canker. Use tree wraps on susceptible trees to help reduce extreme temperature fluctuations. Frost cracks occur when the outside cells of the tree lose water, shrink, and pull apart, causing a crack to open longitudinally with the grain of the wood. Again, tree wraps may help, but some species are simply more prone to cracking than others. Sometimes trees shaded on the south and west sides, where the tree heats up the most, will crack less.

Herbaceous Plant Preparation

Strawberries should be mulched to protect the plants against damage from extreme cold winter weather and from heaving during alternate freezing and thawing weather. Use a loose organic material such as clean wheat straw. Apply mulch after several frosts in the fall but before the temperature drops below 20°F—generally between mid-November and mid-December in Illinois. Apply 100 to 150 pounds of straw per 1,000 square feet (2 to 4 bales) 3 to 4 inches deep over the plants.

Perennial plants also require fall maintenance activity. Remove any excess growth and either burn (if legal) or compost the plant material. It may be advantageous to leave some of the stems so that they can catch leaves—this will help protect the plants. It is also beneficial to mulch perennials after the ground has frozen. Use something that is loose and does not pack down or stay too wet. Perennials vary in their cultural needs, including winter protection; therefore, you may need to research the specific needs of your plants.

When preparing roses for winter, hybrid teas, floribundas, grandifloras, and polyanthas should be pruned back slightly if the canes are excessively long in late fall. It is also a good idea to rake up any fallen rose foliage, especially if blackspot was a problem. Cover the plants after they go dormant. Bushel baskets or commercial covers work well. You will need to trim the canes back to fit underneath the cover. Other ways of protecting the roses include using leaves (oak work best), pine needles, straw, old sawdust, or bark chips. The depth of the material should be 12 inches. Soil is not recommended since it stays too wet and packs too much. In the spring, remove the cover or mulch, trim the canes back to healthy wood (just above the strong bud), and thin the plants to 4 or 5 canes.

Climbing and rambling rose canes may also need winter protection. Lay the canes on a bed of straw and cover with more straw. Be sure to cover the crown. Keep the straw in place by tying or covering it with a small amount of soil. In the spring remove the covering, remove all damaged wood, and place the canes or shoots back on the trellis.

Houseplants that summered out-of-doors should be inside by now, but if they are not, don't delay in bringing them in. Isolate the plants from those already in the house until they are determined to be pest-free. Monitor the watering carefully; they will not require as much water as they did outside. Expect some leaf drop due to acclimatization to lower light levels.

Compost Bins

Compost bins should be turned before cold weather sets in to add air to the pile and encourage decomposition.

Leaf Removal

Leaf removal should be done in the fall not only for aesthetic reasons but because many leaves house pathogens capable of causing disease the following year. Do not allow leaves to lie on the grass as damage can occur. Dispose of leaves through community programs, or use them yourself as mulch or in a compost pile. Check with your local law enforcement agency or fire department before burning, as many local governments prohibit open burning, including leaf burning.

Fall Bulb Planting

Fall is the ideal time to plan for spring by planting tulips, daffodils, crocus, and other bulbs. It is generally best to get them in the ground early, but they can be planted anytime the ground is not frozen. The best bulbs are large, firm, and plump. Avoid any bulbs with bruises, blemishes, or soft spots. Bulbs perform best in locations with full sun and well-drained soil with average fertility. Large bulbs (tulips, daffodils, hyacinths) are generally planted 6 to 8 inches deep and 6 inches apart; small bulbs (crocus, snowdrops, grape hyacinth) are planted 3 inches deep and 3 inches apart. Generally, depth is equal to 3 times the bulb diameter. Plant all bulbs with the base down, cover with soil, firm lightly, and water.

In sum, the more work done through the fall and winter, the less spring cleanup required. Be sure to properly discard all plant wastes. Do not remove winter-protective devices too early in the spring. In areas subject to many late heavy snowstorms and temperature extremes, early mulch removal might be a serious mistake.

For more information, obtain *Horticulture Fact Sheet* LH 179, "Winter Protection for Woody Plants." (Rhonda Ferree and Jim Schmidt)

INSECTS

White Grubs

Annual white grub damage continues to be essentially nonexistent in much of Illinois. Although there is some heavy damage, it is spotty in occurrence and relatively uncommon. We have received reports of damage in northeastern, western, northwestern, southwestern, and central Illinois.

Japanese beetle grubs also appear to be spotty in distribution in those areas of the state where the beetle is present. Little information is available, but populations appear to be well below damaging numbers in northeastern Illinois. There are reports of some spotty turf damage in eastern north-central Illinois, but numbers

appear to be lower than normal. This grub appears to need more moisture than the annual white grub, and the late summer drought may have reduced its numbers.

White grubs can be successfully treated as long as the turf root temperature stays above 50°F. Once root zone temperatures drop below that level, the grubs will move deeper into the soil, below the root zone. In central Illinois, root zone temperatures are still in the upper 60s. A good way to tell whether treatments can still be successful is to pull back the turf and look for grubs in the root zone. If they are present, treatments will be effective. In central Illinois, the grubs usually stay in the turf root zone through October and into early November.

If grub numbers are marginally damaging, in the range of 10 to 15 per square foot, irrigation should help the turf root growth stay ahead of grub feeding damage. Thus, an insecticide application can be avoided. Remember to check these areas in the spring because the same grubs present in the fall will ascend into the root zone to feed in the spring. If there is a spring drought, damage to turf could occur. (*Phil Nixon and Bruce Spangenberg*)

Review of 1996 Insect Activity

Since insect activity for 1996 is mostly completed, a review of the 1996 insect situation is possible. The 1996 growing season started out with heavy rainfall similar to that of 1995. This resulted in a correspondingly heavy floodwater mosquito problem that lasted well into June in most of Illinois. Since the rainy season in northeastern Illinois lasted longer than in the rest of the state, mosquito numbers remained high into July.

The abnormally high rainfall was accompanied by cool temperatures. This combination provides good growing conditions for fungi. One of the main mortality factors of insects, particularly large, soft-bodied insects such as caterpillars, is fungus disease. The cool, wet weather probably caused the reduced number of spring caterpillar problems this year. Eastern tent caterpillars were numerous early but soon were greatly reduced in number. The first generation of fall webworm that occurs in the southern half of Illinois in June went essentially unnoticed due to their low numbers.

Some insects were numerous this spring. European pine sawfly was particularly numerous in southwestern, north central, and northwestern Illinois. Numbers in central Illinois were smaller than normal. Potato leafhopper damage was severe on red maple and other trees from late spring into summer. Wave after wave of these sucking insects occurred in horticultural plantings.

The severely cold winter of 1995–1996 apparently reduced some insect numbers. Honeylocust plant bug

damage was greatly reduced, particularly in northeastern Illinois where the spring of 1995 experienced heavy plant bug damage. Mimosa webworm numbers were reduced when compared to those of 1995. Damage in 1996 occurred primarily on trees near heated buildings where overwintering webworms could find protection.

Praying mantis are rare this fall in central Illinois, particularly the Chinese mantis whose overwintering eggs are marginally hardy. It appears that the Asian multicolored lady beetle is less numerous this summer. It is difficult to tell whether this perceived reduction is due to cold winter weather or the natural drop in numbers that commonly occurs once an invading insect species has been present in an area for a few years.

Japanese beetle numbers were fewer in 1996 in many areas, and there appeared to be little invasion of new areas. The Japanese beetle grub needs moist soil to develop. The drought in late summer and fall of 1995 may have reduced overwintering grub numbers. A similar drought in 1996 may be having a similar effect.

Chinch bugs appeared in some scattered areas in late summer. This insect tends to be more prevalent in dry years, perhaps due to less mortality from insect-attacking fungi. Sod webworms were also common in late summer. This insect is held in check in Illinois by disease organisms that thrive in damp weather. The late summer drought probably aided this insect as well.

Greenbugs appeared in scattered areas in late summer. Conditions may have been suitable for these insects to increase from overwintering eggs. There was also a series of tropical storms and hurricanes in the Florida area and Gulf of Mexico that may have blown greenbugs into Illinois from southern states.

All in all, the insect situation was not very different from past years. It was not "normal," but what year is? (*Phil Nixon*)

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AG Libran

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This newsletter is issued to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

One More Issue

This is the next to the last issue of the *Home, Yard, and Garden Pest Newsletter* for your 1996 subscription. The last issue will arrive about February 1 and will contain the index for the 1996 issues. Next year's issues will probably start in April 1997.

INSECTS

Purdue Pest Control Conference

The Purdue Pest Control Conference addresses the structural pest control industry and is heavily attended by pest control operators, termite control experts, public health personnel, and other professionals. This year's conference runs from January 7 to 11 at the Purdue University Campus in West Lafayette, Indiana. For further information, contact Susan Umberger at (800)359-2968.

Changes in Extension Entomology

With the College of Agriculture reorganization at the University of Illinois, the group formerly known as Extension Entomology has split in two. Phil Nixon and John Lloyd, the urban and landscape entomologists, are now in the Department of Natural Resources and Environmental Sciences. They are still housed on the first floor of the Natural Resources Building with the Illinois Natural History Survey. They no longer have a full-time receptionist, so they will be using voice mail for messages when they are not available.

Phil's phone number remains (217)333-6650. John's phone number has changed to (217)333-6653.

Kevin Steffey, Mike Gray, and Rick Weinzierl have all moved into the Department of Crop Sciences. Kevin and Mike will still answer field crop and stored grain insect questions at (217)333-6651 and are located on the third floor of Turner Hall. Rick will answer fruit, vegetable, and livestock insect questions at (217)333-6652 and is located on the fifth floor of Turner Hall.

Even though our departments have changed and our locations are still in a state of flux, our responsibilities remain the same. We will continue to provide answers, information, and educational programs on insect management through these different channels. We will keep you updated as additional changes occur. (*John Lloyd and Phil Nixon*)

Asian Multicolored Lady Beetles

Asian multicolored lady beetles are a common problem entering homes throughout Illinois, although the problem seemed to be more severe in northwestern Illinois this fall. They enter cracks and crevices, particularly around windows, and fly through doors as people go in and out. On warm, sunny days they emerge from cracks and crevices to crawl and fly around the home, being attracted to warm, sunny windows.

The 1/4-inch-long insects are dome-shaped and roundish, as are other lady beetles. They usually have orange wingcovers with 19 black spots. True to their multicolored name, they range from tan to red, and their spots run from very tiny or absent to large and obvious. Both the larvae and adults feed on a wide range of soft-bodied, slow-moving insects such as aphids and young caterpillars. They also feed heavily on soft scale insects, which is why they were imported into this country from Japan.

When fall approaches, the adults seek overwintering sites. In their native lands, they overwinter in



cracks and crevices of cliffs, but in Illinois those sites are hard to find. Instead they enter cracks and crevices in our buildings. In the spring, they will go outside to lay eggs.

The resulting larvae are soft-bodied and elongate, their 6 legs sprawling out to the side making them look like tiny alligators. When fully grown, they are about 3/8-inch long and black; they have a broad orange band in the middle with a black stripe running down the center of it. A whitish stripe runs down the middle of the back from the head to the orange band.

Fully grown larvae turn into 1/4-inch-long pupae on the leaves. These pupae are roundish and orange, and they may have black spots. Adult beetles emerge from the pupae when fully developed.

Outdoors, these beneficial insects should not be harmed. Their feeding on large numbers of aphids, scale, and other harmful insects makes up for what little nuisance problems they cause. Indoors, they can be vacuumed or removed individually. Insecticide sprays are likely to have little effect on such a hard-shelled insect that is not feeding. Caulking cracks and crevices around windows, along the foundation, and around doors should reduce the number that will be able to get indoors. (*Phil Nixon*)

Pine Root Collar Weevil

Pine root collar weevil, *Hylobius radialis*, has been positively identified in Illinois. They have been found in the Beardstown area in west-central Illinois and in Lee County in northern Illinois. These are the first records for this insect in Illinois.

Pine root collar weevil feeds as larvae under the bark of pine trees in the root collar area, that is, just at and below the soil line. It is being found primarily on Scotch pine growing in sandy soil in Illinois. Feeding by the larvae essentially girdles the tree. Light or early infestations result in dead terminal and accessory shoots at the top of the tree. Heavier infestations cause the tree to die with the needles turning light green and then brown. Infested trees can be easily pushed over, the weakened trunk snapping just below the soil line.

Larval attack results in black soil next to the trunk due to sap leakage. There are usually masses of hardened, whitish, exuded pitch at the soil line. The trunk just below the soil line has 1/8- to 1/4-inch-diameter tunnels just below the bark. In most cases, the overlying bark sluffs off during digging to reveal these tunnels. The trunk in this area is narrower due to this tunneling than it is above and below the damaged

area. This larval-damaged area frequently extends for 3 to 4 inches below the soil line.

Larvae feed throughout the summer, pupating, and emerging in late summer. Adults overwinter in debris under the tree and emerge in the spring to feed and lay eggs. Adult feeding is similar to Pales weevil and northern pine (deodar) weevil feeding since the bark of twigs is eaten, causing the needles on these twigs to turn brown. This flagging is easily noticeable and should tell the grower to look closer for pine weevil attack. Adult beetles can live for 2 years.

Control pine root collar weevil by spraying the base of the tree in mid-May and mid-August with lindane. Raking debris from beneath the tree increases the level of control. This is primarily a pest of Christmas tree plantings, and old fields should not be replanted to pines for at least 2 years to avoid long-lived adults.

The adults can fly but are unlikely to infest fields that are at least 1/2 mile away. Interplanting of seedlings among older trees should not be done to help avoid problems from pine root collar, Pales, and northern pine weevils. Short-needled varieties of Scotch pine, such as Southern French, Turkish, or others from west or south Eurasia, appear to be less susceptible to pine root collar weevil than other varieties. (*Phil Nixon*)

Winter Protection from Mammal Feeding

Deer, rabbits, and voles all cause serious damage to trees and shrubs in winter. Voles, also known as deer mice, girdle young trees at the soil line and burrow into the soil, loosening roots. Removing thick layers of bark mulch and brushing snow away from the trunk removes cover for the voles, greatly reducing the amount of damage that occurs.

Rabbits will strip the bark from shrubs and small trees and can reach areas as high as 2 feet by standing on the crusted snow. Fencing in individual trees or groups of shrubs with poultry netting (chicken wire) provides protection. When fencing individual trunks, make sure that the fencing stands out from the trunk to prevent rabbits from biting the bark through the mesh. The fencing should extend at least 2 feet above the expected snow depth. If this fencing fits tight against the ground and has 1/4-inch mesh or smaller, it will also deter vole feeding.

Thiram will keep both deer and rabbits from feeding. Ropel (trademark) sprayed on susceptible woody ornamentals is an effective repellent. Plants should be sprayed between Thanksgiving and Christ-

mas and again in February to provide winter-long protection. Deodorant soap, particularly Dial, will protect woody plants from deer attack. Hang the soap bars on the ends of branches because soap running down the trunk will attract rabbits.

Other repellents may also be effective. Realize that repellents, and to a certain extent fencing, are effective only in relation to the pressures that are on the wildlife. If the damaging wildlife has an attractive feeding alternative, then these measures tend to work well. If there is no other food source or the population pressure is too high, plantings will be damaged regardless of the repellent used. (*Phil Nixon*)

PLANT DISEASES

Disease Problems with Wood Chips

Clinic staff, Extension educators, master gardeners, and others are often asked whether there are plant disease risks in using wood chips as mulch around healthy plants. Wood chips are often provided free of charge or at a minimal cost by municipalities, foresters, or commercial arborists. This seems like a clean, environmentally wise use of wood trimmings. So is there a catch? Are we promoting spread of pathogens with this practice?

Root rots, canker diseases, and vascular diseases may cause decline and dieback in trees necessitating branch removal or pruning. This wood is often included with that used to create wood chips available for general landscape use. Spread of root rot pathogens via wood chips is not a concern because root rot pathogens are not present above ground in the wood. We can also eliminate worry over most of the canker fungi. These pathogens only cause problems on plants under stress. Since the canker-causing fungi are more or less ubiquitous in the landscape, the increased inoculum level of canker fungi that might survive in wood chips is thought to be insignificant to canker disease initiation.

The major concerns with wood chips come from the vascular diseases, specifically pine wilt, verticillium wilt, oak wilt, and Dutch elm disease. There are research reports concerning the first two diseases. I am going to go out on a limb (no pun intended) with the latter two. We know about the disease epidemiology, but we are not certain about what happens to the pathogens in stockpiles of wood chips.

The spread of pinewood nematodes in wood chips has been researched. Even if the nematode could

survive the chipping process and remain viable in the chips, research has shown that the nematodes do not move into the soil, so roots are not threatened with infection. Other research also shows that the Sawyer beetle vector of this disease does not frequent wood chips. This should mean that beetles will not feed on infested wood chips, pick up the nematodes, and then proceed to inoculate healthy trees. Still, in a fresh batch of wood chips, it is possible that the beetles could be transported with the chips to the new site where they could emerge and fly to uninfected trees. This possibility is very slim but might be reduced if the wood chips could first be dried or composted.

The *Verticillium* fungus has been shown to be transmitted in fresh wood chips taken from a known *Verticillium* infected tree. I still have not seen research to test the effect of composting these chips before use. Work next summer in Minnesota will test the effect of static piling *Verticillium* infected wood chips before use around plants. The goal will be to determine whether the fungus will still infect roots. At present our recommendation is that wood from a *Verticillium*-infected tree should not be used for chipped mulch. Since the *Verticillium* fungus is sensitive to drying, the risk of disease spread might be reduced if chips could be dried before use, but this has not been tested.

Oak wilt and Dutch elm disease can be addressed together. The fungi causing these diseases are not soil-borne. There is no threat that the fungi will move from the chips into the soil and into the roots. The only concern I would have is the possibility that sap beetles would be attracted to disease-infected wood chips, pick up the fungal spores, and move to a healthy tree to feed, inoculating the tree in the process. According to entomologists, this is very unlikely to occur. Still, if the bark chips are dry, they will not have fresh sap to attract the beetles. Logically, drying out the mulch should reduce the slim risk that may be present.

In summary, wood chips used as mulch could initiate new *Verticillium* wilt infection but should not cause a problem with other diseases. In order to reduce the risk of *Verticillium* spread, try to monitor the source of the chips, and spread the mulch in a thin layer on a concrete-like surface to dry before use around your plants. As further information is available concerning plant disease risks with use of wood chips, I will alert you via this newsletter. (*Nancy Pataky*)

White Pine Decline Update

In recent meetings with arborists, master gardeners, and others interested in tree problems, I have described the

problem that we have seen on white pines in the Midwest over the last 10 years or so. The details of this problem are described in issue number 18 of this newsletter. Many who work with trees have seen this same problem. Two arborists have related causes that I would like to convey to you as additional possibilities that we have not previously discussed. In many cases more than one factor is involved, so these are two more factors to consider when you try to investigate the cause of decline of a white pine.

One report was from an arborist in Springfield. He noticed scattered white pines dying in a nursery situation. Further investigation uncovered ant mounds near, but not within, the root zone of dying trees. Ants from the mounds had totally girdled the trees at or just below the ground line. Take the time to uncover the trunk a few inches below the soil line. This sort of problem should be visible on the main trunk.

Another report was from an arborist in Champaign who provided me with an article from "Bartlett Tree Tips." Besides the problems that we have discussed with excess moisture in the root zone, this article pointed out that the constant presence of moisture on the collar and lower trunk can also prevent oxygen and carbon dioxide exchange through the living bark. Over an extended time, this condition may kill the phloem and eventually the entire tree. This might occur if the root collar is buried by soil or by mulch that is always wet.

Diagnosis of tree problems is a continual process. Just when we think we have eliminated all of the possibilities, our eyes are opened up to new ideas. Every situation is different. I appreciate the input that I have received from many of you who help keep me on my toes. (Nancy Pataky)

HORTICULTURE

1997 North Central Turfgrass Exposition

The 1997 North Central Turfgrass Exposition (NCTE) will be held December 2 to 5, 1996, at the Pleasant Run Resort in St. Charles, Illinois. Last year more than 1,600 green industry professionals participated in the educational sessions and trade show of this annual event.

The NCTE provides educational opportunities from Monday afternoon through Thursday morning for individuals connected with golf courses, sports turf, lawn care, sod production, and landscaping, as well as others involved in the green industry. Presenters

during the educational sessions are highly regarded and come to the NCTE from the local green industry, the University of Illinois, and other U.S. universities. The trade show features more than 80 vendors and 170 booths and is open during the Tuesday and Wednesday of the show.

The University of Illinois Cooperative Extension Service is one of the sponsoring organizations of this annual event. The NCTE is coordinated by the Illinois Turfgrass Foundation. Registration can be paid in advance, or paid at the door during the Exposition.

Contact University of Illinois Extension turfgrass specialist Tom Voigt at (217)333-7847 for additional information.

1997 Indiana-Illinois Turfgrass Short Course

The early February issue will contain details of the 1997 Indiana-Illinois Turfgrass Short Course, to be held on February 24 to 28, 1997, at the Pheasant Run Resort in St. Charles, Illinois. The course is designed to provide training for individuals who are employed or considering employment in the turf industry. A new 2-day advanced course, "Turfgrass Growth Responses to Environment and Management," developed to accompany the established Short Course, will be offered on February 26 and 27. GCSAA credit has been sought for both courses. Registration materials will be available in December. If you need additional information at this time, contact University of Illinois Extension turfgrass specialist Tom Voigt at (217)333-7847 for additional information.

Home, Yard and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.

Major authors are Phil Nixon and John Lloyd, (217)333-6650, Fredric Miller, (708)352-0109, and Tom Royer, (618)692-9434, entomologists; Nancy Pataky, plant pathologist, (217)333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217)333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. This newsletter was edited by Francine Weinbaum, typeset by Jerry Barrett, and proofread by Herbert Morgan, all of Information Services.

HOME, YARD & GARDEN PEST

college of agricultural, consumer and environmental sciences, university of
illinois at urbana-champaign ■ illinois natural history survey, champaign

NEWSLETTER

FEB 06 1997

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No. 22 • February 5, 1997

This newsletter is issued to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Nuisance Fruit Removal

Since the key to success controlling "nuisance fruits" is timing, now is the time to think about these applications. This will ensure that you do not miss the "window of opportunity" this spring.

Although several chemicals are available to eliminate nuisance fruit, ethephon is the most commonly used and readily available. A foliar spray of ethephon is used to reduce or eliminate undesirable fruit development on many ornamental trees and shrubs such as crabapple, cottonwood, elm, ornamental pear, maple, oak, pine, sweetgum, and sycamore. Ethephon is available from several formulators under different trade names, including Florel and Ethrel. Ethephon eliminates much of the fruit without affecting leaf growth and color or harming the turfgrass or other woody plants around the trees that may have captured drift from the application. Ethephon eliminates the fruit without causing premature flower drop and thus interrupting the spring flower show.

As with all chemicals, check the pesticide label carefully. Again, the key to success with fruit removers is timing. The application must be made during flowering but before fruit set in. Spray volumes sufficient to wet but not to runoff. For most flowering trees, there is a 10-day to 2-week window in which to make the application. Sweet gums are a little tricky

since the flowers are not showy; however, arborists have found that sprays are effective just as new leaves begin to emerge.

Upon entering the plant, ethephon breaks down to ethylene, a naturally occurring plant hormone. Ethylene production within the plant is stimulated by stress. For this reason, it is important that plants being treated are not under stress from drought, high temperature, disease, or other such environmental conditions. Treating stressed plants can cause severe injury to the plant such as defoliation or leaf scorching. (Rhonda Ferree)

1997 Indiana-Illinois Turfgrass Short Course

The fourth annual Indiana-Illinois Turfgrass Short Course will be held February 24 to 28, 1997, at the Pheasant Run Resort in St. Charles, Illinois. This course is designed to provide training for individuals who are employed or considering employment in the turf industry. During the past 3 years, more than 140 students have successfully completed the 5-day program. The Indiana-Illinois Turfgrass Short Course will provide lecture and hands-on laboratory sessions designed to provide training on turfgrass selection, establishment, management, soils, fertility, and pest management. Students successfully completing the course will receive a certificate of completion. In addition, Golf Course Superintendents Association of American Continuing Education Units and Indiana Category 3b CCHs have been requested.

The Indiana-Illinois Turfgrass Short Course is sponsored by the Midwest Regional Turf Foundation and the Illinois Turfgrass Foundation in cooperation with Purdue University and the University of Illinois; Timothy Gibb, John Graveel, Zac Reicher, Clark Throssell, and Fred Whitford of Purdue University; and Randy Kane of the Chicago District Golf Association.

FEB 06 1997

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Telephone University of Illinois Extension turfgrass specialist Tom Voigt at (217)333-7847 for additional information.

Indiana-Illinois Turfgrass Short Course Offers New Advanced Course

The Illinois Turfgrass Foundation and the Midwest Regional Turfgrass Foundation are pleased to offer "Turfgrass Growth Responses to Environment and Management," a new 2-day advanced course developed to accompany the established Indiana-Illinois Turfgrass Short Course. This 2-day course is designed for golf course superintendents, sports turf managers, lawn care professionals, sod growers, and other turf managers with some background in introductory plant physiology, soil science, and turf management activities. The seminar will address turfgrass growth responses to weather conditions, light quantity and quality, traffic, soil conditions, management activities, and pest control. An exam will conclude the 2-day course and will be mandatory for students wishing to obtain a certificate of successful completion. GCSAA credit has been sought. Instructors for this course will include turfgrass specialists from the University of Illinois, Purdue University, and the Chicago District Golf Association.

The program will be held on February 26 and 27, 1997, at Pheasant Run Resort in St. Charles, Illinois, a western suburb of Chicago. The cost of this 2-day seminar is \$150 for members of the Illinois Turfgrass Foundation or the Midwest Regional Turfgrass Foundation, and \$250 for nonmembers. The registration cost will include two lunches and learning materials. Registration materials will be available in December.

Telephone University of Illinois Extension turfgrass specialist Tom Voigt at (217)333-7847 for additional information.

INSECTS

Dormant Oil Insect Control

Dormant oil, also called superior oil, Volck oil, and horticultural oil, controls overwintering scale insects, mite eggs, aphid eggs, and other pests by covering and suffocating them. Many of the oils that are applied at a lower rate as summer oil sprays are labeled for heavier rates as dormant sprays.

Dormant oil is applied when the temperature stays above freezing for 24 hours after treatment. This

allows the oil to evaporate relatively quickly and reduces phytotoxicity. Dormant evergreens, with their greater leaf area, are normally treated with a lower 2 percent oil rate on days when the temperature stays above 40°F for 24 hours after treatment.

Most scale insects overwinter as nymphs or adults and are easily controlled by dormant oil sprays. Dormant oil is not very effective against scales that overwinter totally or partially as eggs such as oyster-shell scale and pine needle scale. European red mite, a frequent pest of fruit trees, overwinters as exposed eggs and is controlled with dormant oil sprays. Many overwintering two-spotted mite eggs are laid on grasses and groundcovers and are not susceptible to dormant oil sprays. Honeylocust mites overwinter as adults under bark and become active on warm days in early spring, making them susceptible to dormant oil. *(Phil Nixon)*

Pesticide Applicator Training

Several opportunities remain to attend ornamental and turfgrass pesticide applicator training. General Standards training is from 8 to 11:30 a.m. on the first day, with testing from 12:30 to 4 p.m. Ornamentals training is from 2 to 5 p.m. on the first day, with Turfgrass training on the second day from 8 to 11:30 a.m. Testing for categories will be from 12:30 to 4 p.m. on the second day.

Feb 10-11	Peoria	Holiday Inn City Center Hamilton and Madison
Feb 19-20	Matteson	Holiday Inn I-57 and Rt. 30
Feb 26-27	Rockford	Clocktower Resort I-90 and Business 20
Mar 6-7	Willowbrook	Holiday Inn Rt. 83 and I-55
Mar 11-12	Palatine	Woodfield Ramada 920 E. Northwest Hwy.
Mar 13-14	Moline	Holiday Inn I-74 and Airport Exit
Mar 18-19	Glen Ellyn	Holiday Inn Rt. 38 and Finley Rd.
Mar 24-25	Urbana	Holiday Inn I-74 and Lincoln Ave. (may be at Park Inn, call to confirm)

Mar 26–27	Matteson	Holiday Inn I-57 and Rt. 30
Apr 1–2	Mundelein	Holiday Inn 510 E. Rt. 83
Apr 9–10	Westmont	Inland Expo. Center 400 E. Ogden
Apr 15–16	Rosemont	Holiday Inn-O'Hare 5440 N. River Rd.
Apr 22–23	Mt. Vernon	Holiday Inn I-57 and I-64
Apr 29–30	Peoria	Holiday Inn City Center Hamilton and Madison

Preregistration is required at all clinics. There is a \$20 fee per person per clinic. One fee covers both days of training at each clinic. To preregister call (800)644-2123. (Phil Nixon)

PLANT DISEASES

Anthracnose on Landscape Dogwoods

Because of the presence of a relatively new disease of dogwood in the Midwest, including Illinois (see Issue Nos. 8 and 14), people have been concerned about the survival of this group of plants. The dogwood anthracnose disease does pose a threat to the native dogwoods in forested situations, and in those situations the effect can be quite dramatic. The dogwoods in home lawns, commercial landscapes, and nurseries, however, are far less at risk.

Dogwood anthracnose is not likely to become a major problem on landscape trees in Illinois. The fungus causing the disease requires prolonged leaf wetness, as is prevalent near waterways, on north-facing slopes, or on high elevations. The open, dry settings of most of our landscape dogwoods are not conducive to infection. In the March 1996 issue of the journal *Plant Disease*, an article described the seriousness of dogwood anthracnose in Maryland's Blue Ridge Mountains. It said that (surviving) "flowering dogwoods were most common at the forest edge . . . The road edge provides an open setting that promotes leaf drying, an impediment to disease development."

With the drier Illinois summers and placement of dogwoods in partial rather than full shade, dogwood anthracnose is less likely to be a problem.

There has been much research on dogwoods, dogwood anthracnose, and other pests of dogwood, some of it still in active progress, especially at the Institute of Agriculture at the University of Tennessee. In a University of Tennessee Agricultural Experiment Station Research Report (91-06), the question was posed: "Should I continue to plant flowering dogwoods in my yard?" Even in that area of high dogwood anthracnose incidence, the answer was: "If you are willing to maintain your flowering dogwoods in the best possible manner, the answer to this question is YES. It is very likely that lawnmower and weed-eater damage poses a more significant threat to flowering dogwoods in the urban landscape (with exception under specific circumstances) than anthracnose ever will."

Although native dogwoods in forests are threatened by dogwood anthracnose, there is no reason to give up on dogwoods as a landscape plant in Illinois. As new information is available about this disease and its management, Cooperative Extension specialists will pass it on to you through this newsletter and other vehicles. (Nancy Pataky)

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Horticulture

Algae, in ponds, controlling 7:1
 Annuals, blooming? 9:1
 Blossom end-rot, of tomato 15:1
 Blueberries 1:4
 Bulb, fall planting of 20:3
 Chlorosis, iron 11:2
 Compost bins 20:3
 Ethephon, for nuisance fruit removal 1:3, 22:1
 Flowers, perennial 1:4
 Garlic mustard 4:2
 Hail, plant injury from 9:1
 Herbicide applications, preemergence 1:4; systemic efficacy and weather 13:1
 Leaf removal 20:3
 Nutsedge, yellow 6:4; and herbicides 13:1
 Partnership Illinois, State Fair exhibit 16:4
 Plant(s), ornamental (woody, herbaceous), winter preparation for 20:2,3; stress and early fall color 19:4; waterlogged 5:3
 PPE, chemical-resistant 10:5
 Raspberries, pruning 1:4
 Roses 1:4, survival of 2:3
 Roundup Pro 3:3
 Salt damage, to landscape plants 2:2
 Spring, cleanup and preparation for 1:4; emergence update 5:3
 Strawberries 1:4. *See also* under **Plant Diseases**.
 Turf, Illinois, and weather 2:3
 Turfgrass Exposition, 1997 North Central 21:4
 Turfgrass Short Course, 1997 Indiana-Illinois 21:4, 22:1; new advanced course 22:2
 Winter injury, of woody ornamentals 1:4
 Weed control, postemergence chemical, of broadleaf, in turf 4:1
 Weeds, scouting for 18:1

Insects

Aphid(s) 9:2; apple grain 4:3
 Ash decline (dieback) 9:3
 Aster yellows 19:2
 Ataenius, black turfgrass 5:4, 12:1, 17:3
 Bagworm(s) 9:2, 11:3, 12:1, 16:1
 Bee, leafcutter 17:3
 Beetle(s), Asian multicolored lady 21:1; bark, on pine 18:2; bean leaf 8:3; elm leaf 8:4; false Japanese 7:2, 12:2, 14:3; green June 15:2, 16:1; imported willow leaf 8:4; Japanese 12:2, 13:2, 14:3, 15:2, 16:1, 18:2, 19:1, 20:4; leaf 8:4; longhorned 16:2;

pine shoot 2:4, 4:4, 15:1; willow leaf 8:4
 Biological Control Conference 19:2
 Borer(s) 5:6; bronze birch 5:4, 8:3; lilac/ash 6:1, 8:3, 10:1, 12:1; Viburnum 8:3
 Bugs, chinch 18:2; lace 11:4, 20:4
 Cankerworm 6:2
 Caterpillar(s), Eastern tent 2:4, 3:1, 4:3, 6:1, 9:1; walnut 12:2; yellow-necked 11:3, 12:2, 15:1, 18:2, 20:4
 Cicada, killer(s) 15:2; periodical 10:2
 Cutworm, black 14:3, 17:3
 Earwig(s) 11:3
 European pine sawfly 2:4, 3:1
 Extension Entomology, changes in 21:1
 Greenbugs 18:2, 20:4
 Grub(s), annual white 9:2, 12:1, 13:3, 14:3,4, 15:1, 16:1, 17:3, 18:1, 20:3,4; true white 5:4; Japanese beetle 20:3. *See also* under **Beetle, Japanese**.
 Imidicloprid 2:4
 Insect activity, review of 20:4
 IPM training 8:3
 Lacebug(s) 14:4
 Leafhopper(s), potato 5:4, 6:1, 9:2, 10:1, 11:3, 12:1, 13:2, 15:1, 16:1, 20:4
 Leafminer, alder 18:2, 19:2; birch 9:1, 18:2, 19:2; elm 5:4; locust 14:4
 Leafstem gall, hickory 16:1
 Mammal feeding, winter protection from 21:2
 Mite(s), conifer spider 10:2; honeylocust spider 2:4, 6:1; spruce spider 3:2, 6:1; two-spotted spider 13:2; Zimmerman pine 18:2
 Mosquitoes 8:3
 Moth(s), American dagger 19:1; Crecropia 11:3; sod webworm 13:2, 18:1; white-marked tussock 7:2, 11:3, 12:2; Zimmerman pine 17:4, 18:2
 Oils, dormant (superior, Volck, horticultural), for insect and mite control 1:1, 22:2
 Pesticide Applicator Training 22:2
 Plant bug, honeylocust 5:4, 6:1, 8:3, 10:1, 20:4
 Planthopper 13:2, 16:1
 Praying mantis 20:4
 Prediction models 10:2
 Purdue Pest Control Conference 21:1
 Sapsucker, yellow-bellied 4:4
 Sawfly(ies) 9:2; European pine 3:1, 7:2, 10:1, 20:4
 Scale insects 7:2, Euonymous 9:2; fletcher 10:1; lecanium 8:3, 9:2; oystershell 5:4, 9:2; pine needle 6:1
 Scouting 2:4
 Spittlebug 10:1
 Squirrels 16:2
 Termite, Eastern subterranean 2:4

Ticks, deer 5:4
 Twig pruners and twig girdlers. *See* Beetle(s), longhorned.
 Vanhoutte spirea, insects on 5:3, 7:2
 Webworm, fall 11:3, 12:1, 17:4, 18:2; mimosa 14:4, 16:1, 17:3, 20:4; sod 12:1, 17:3, 18:1, 20:4
 Weevil(s), conifer root and trunk feeding 19:1; Pales 19:1; pine root collar 5:5, 19:1, 21:2
 Wilt, oak 9:4; Verticillium 9:3

Plant Diseases

Arborvitae, blackening of 3:3
 Anthracnose, dogwood 8:1, 14:2; on landscape dogwoods 22:3; or scorch? 6:3; of shade trees 4:3, 6:3; on tomato 14:1.
 Ash decline or dieback 9:3
 Black knot, of plum and cherry 13:3
 Blight, Botrytis 3:3; early, of tomato 14:1; fire 6:2; gummy stem, of cucurbits 17:1; Kabatina, of juniper 5:1; Phomopsis, of juniper 5:1; Sphaeropsis, of pine 16:3; stem, of Vinca minor 7:4; Volutella, of Pachysandra 4:2
 Blister, oak leaf 7:4
 Brown patch, of turf 13:4
 Canker(s) 11:1; Cytospora, of spruce 3:2, 19:4; rose cane 19:3
 Damping off, of seedlings 2:1
 Dieback 11:1
 Disease, avoidance in landscape 20:1; prevention through sanitation 1:3
 Dutch elm disease 14:2
 Elm yellows 14:2
 Fungi, on mulches 11:2
 Gall, crown 12:3
 Goutweed (bishop's weed, ashweed, ground ash, ground elder, or herb gerard) 15:4
 Leaf blister, oak 7:4
 Leaf blotch, of horse-chestnut 17:1; (red spot or measles) of peony 17:2
 Leaf curl, peach 6:3
 Leaf spot, Coniothyrium, of Yucca 8:2; English ivy 5:1; Septoria, of tomato 14:1; of turf 8:1
 Mildew, powdery 10:3
 Mold(s), slime, on mulches 11:2; snow, of turfgrasses 2:2; white, Sclerotinia white 15:3, 20:2
 Needle cast, Rhizosphaera, in spruce 3:2
 Patch, brown, of turf 10:4, 13:4
 Plant Clinic, opens 1:2; closes 18:3, 19:2
 Pine, white, decline of 21:3; problems 18:3
 Reports on Plant Diseases (RPDs) 3:3
 Rosette, rose 10:3

Rot, bacterial soft, of iris 6:3; brown, of stone fruit 17:2; root, of annuals and perennials 15:3; root, of rhododendron 15:4
 Rusts, on turf 19:3
 Scab, apple 2:1, 4:2
 Scorch. *See* Anthracnose or scorch?
 Spot, bacterial, of pepper 8:2; dollar 10:4
 Spruce problems 3:2
 Strawberries 4:2. *See also* under **Horticulture**.
 Wetwood, bacterial, of trees 11:1
 White pines 18:3
 Wilt(s), bacterial, of vine crops 12:4; oak 9:4; pine 5:2, 20:2; Stewart's, of sweet corn 13:4; tomato 12:3; Verticillium 9:3 (of magnolia) 16:3
 Witches' broom, of hackberry 16:4
 Wood chips, disease problems with 21:3

Illustrations

Tree and Shrub Pests I 2:7
Tree Diseases II 2:9
Vegetable Diseases II 2:11
Vegetable Diseases III 2:13

Other Topics

Biweekly issues start 16:1
 Horticulture Field Day, University of Illinois 14:1
 Last regular issue for 1996 20:1
 One more issue 21:1
 Subscription 4:5
 Welcome 1:1

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